4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential beneficial and adverse social, economic, and environmental effects of the No-Build Alternative (Alternative A) and Build Alternative (Alternative M). In addition, impacts are described for the proposed roadway improvements associated with the Build Alternative. This chapter also includes discussion on measures proposed to avoid, minimize, and mitigate adverse impacts.

Since the Build Alternative consists of an elevated viaduct within the existing BNSF right-of-way, the impacts would be limited to the immediate vicinity of the proposed improvements. For the purposes of determining effects to various resources, a distance of ½-mile was selected for the analysis, unless otherwise noted.

4.1 LAND USE

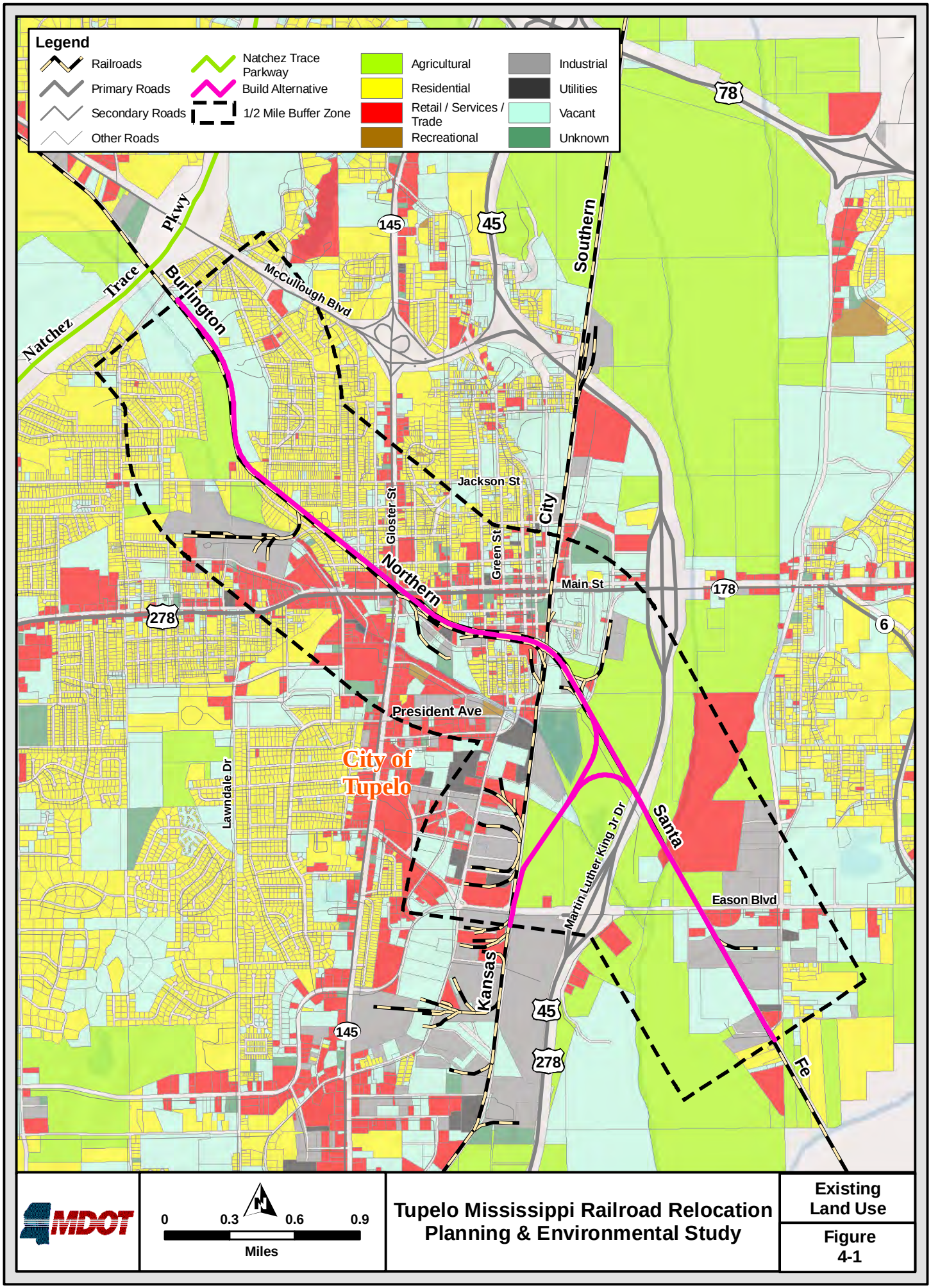
4.1.1 Impacts to Existing Land Use

The primary land uses within a ½-mile of the BNSF main line, shown in **Table 4-1** and shown on **Figure 4-1**, are agricultural (17%), total commercial (12%), total industrial (12%), total residential (17%), vacant (17%), and transportation (18%). Commercial and industrial land uses and vacant land suitable for development are good indicators that there is a great deal of development already existing in this area and that there is available land for continued growth.

Table 4-1 Existing Land Use within ½-Mile of Build Alternative

Land Use by Parcel	Area (acres)	% of Area
Agricultural	607	17.46%
Commercial Retail-Wholesale	205	5.90%
Commercial Services-Office	255	7.34%
Industrial-Heavy	301	8.66%
Industrial-Light	104	2.99%
Medical	30	0.86%
Public Government	8	0.23%
Residential 1-2 Family	553	15.91%
Residential Mobile Home	0	0.00%
Residential Multi-Family	44	1.27%
Semipublic	39	1.12%
Transportation-Utilities-Communication	41	1.18%
Vacant Suitable for Development	582	16.74%
Unknown	76	2.19%
Transportation R/W (Streets, Highways, Railways, and Natchez Trace)	631	18.15%
Total	**3,476**	**100%**

Sources: Mississippi Automated Resource Information System (MARIS), City of Tupelo Planning and Development Department


Legend
Railroads
Primary Roads
Secondary Roads
Other Roads
Natchez Trace Parkway
Build Alternative
1/2 Mile Buffer Zone
Agricultural
Residential
Retail / Services / Trade
Recreational
Industrial
Utilities
Vacant
Unknown
Natchez Trace Pkwy
Burlington Northern Santa Fe
Southern City
McCullough Blvd
Jackson St
Gloster St
Green St
Main St
President Ave
Lawndale Dr
Martin Luther King Jr Dr
Eason Blvd
Kansas
City of Tupelo
78
145
45
278
178
6
0
0.3
0.6
0.9
Miles
MDOT
Tupelo Mississippi Railroad Relocation Planning & Environmental Study
Existing Land Use
Figure 4-1

No-Build Alternative

Since there are no improvements involved, there would be no impacts to the existing land use as a result of the No-Build Alternative.

Build Alternative

The majority of the Build Alternative would remain within the existing BNSF right-of-way, with approximately two acres of right-of-way acquisition area from vacant parcels for the storage tracks and approximately 11 acres of either agricultural or vacant land for the interchange tracks. Land use changes adjacent to the Build Alternative are not anticipated as the proposed design would not disturb any occupied residential or commercial parcels. The agricultural areas would be bisected by the interchange track, but agricultural activities can be maintained on both sides of the right-of-way. All at-grade crossings would be eliminated between Lumpkin Avenue and Veterans Boulevard. This would reduce many of the adverse impacts of the current facility, such as traffic congestion and noise. By reducing adverse impacts associated with a rail facility, greater traffic flow and further economic development could be realized by neighboring land uses.

4.1.2 Impacts to Proposed Land Use

4.1.2.1 Consistency with Comprehensive Plans

Tupelo: The Story Continues - The 2025 Comprehensive Plan (December 2008 www.tupeloms.gov/development/tupelo-2025) was adopted by the City of Tupelo to outline the City's and region's growth and development plan for the next two decades. The plan is updated every five years and directs inter-agency coordination and molds policy. Some of the main goals of the comprehensive plan include revitalizing neighborhoods, expanding economic development, and improving transportation. The comprehensive plan identified the relocation of the BNSF railroad crossing at the Crosstown intersection as an immediate need to enhance transportation safety within Tupelo. The development of a network of greenways, bikeways, and sidewalks was also identified in the comprehensive plan as a long-term goal.

No-Build Alternative

Without improvements to the BNSF main line or relocation of the rail lines from the Crosstown intersection, the comprehensive plan would need to be adjusted in order to facilitate future development. These adjustments would include changes to the roadway network to accommodate the anticipated traffic delay. The comprehensive plan goal of removing the rail lines from the Crosstown intersection would not be satisfied. As a result, the No-Build Alternative would not be consistent with the revised comprehensive plan.

Build Alternative

The Build Alternative would effectively remove the at-grade railroad crossing from the Crosstown intersection, satisfying the immediate need identified in

the comprehensive plan. With this removal, the existing roadway network would require fewer enhancements to facilitate future development. In addition, the proposed multi-use trail could serve as the spine of a pedestrian/bicycle facility network within Tupelo. Therefore, the Build Alternative would be consistent with the recently adopted comprehensive plan.

4.1.2.2 Zoning Impacts

Zoning codes within ½-mile of the Build Alternative, shown in **Table 4-2** and shown on **Figure 4-2**, are diverse. The zoning district definitions are the same as discussed in **Section 3.2.2.1**. By traversing downtown Tupelo, many different zoning areas are bisected, including the many sub-districts of the downtown overlay districts.

Table 4-2 Zoning within ½-Mile of Build Alternative

Zoning District	Zoning Abbreviation	Area (acres)	% of Area
Agricultural-Open District	A-O	712	20.70%
Light Commercial District	C-1	2	0.06%
General Commercial District	C-2	435	12.65%
Heavy Commercial District	C-3	248	7.21%
Central Business District	CBD	285	8.28%
Light Industrial District	I-1	545	15.84%
Heavy Industrial District	I-2	139	4.04%
Office District	O	109	3.17%
Planned Unit Development	PUD	4	0.12%
Medical District	M-1	1	0.03%
Residential Estate District	R1-E	0	0.00%
Large Lot Residential District	R1-L	40	1.16%
Medium Lot Residential District	R1-M	862	25.06%
Small Lot Residential District	R1-S	7	0.20%
Two Family Residential District	R-2	26	0.76%
Multi-Family Residential District	R-3	22	0.64%
Residential/Office Mixed District	R-O	3	0.09%
Total		**3,440**	**100%**

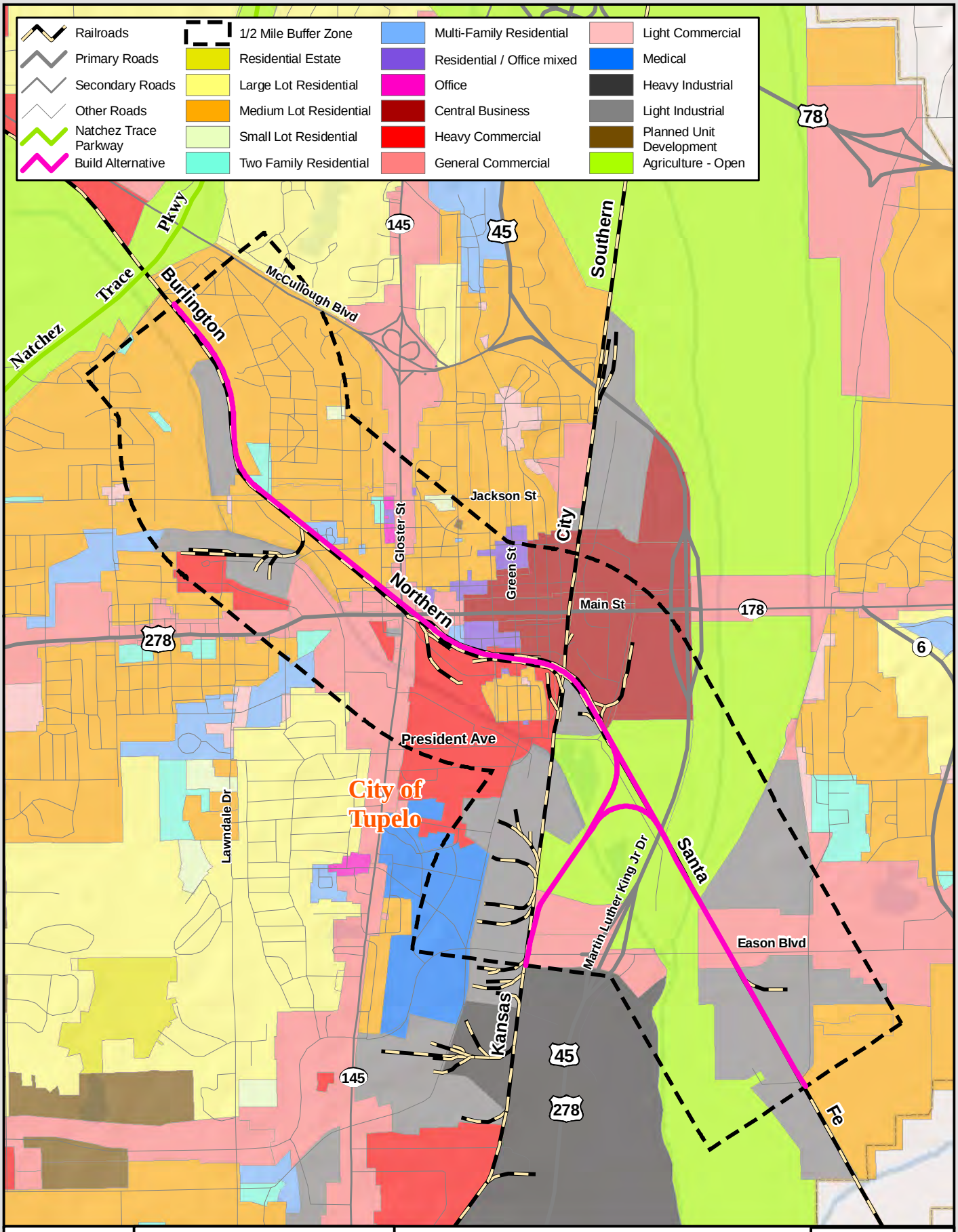
Sources: Mississippi Automated Resource Information System (MARIS), City of Tupelo Planning and Development Department

No-Build Alternative

Since no improvements would be involved, the intended zoned uses would be preserved. There would be no impact to zoning with the No-Build Alternative.

Build Alternative

The Build Alternative would preserve the intended zoned uses by retaining the location of the rail line throughout the city. No impacts to zoning are anticipated with the Build Alternative. However, the grade-separated rail would mean less opportunity for rail-served industrial uses along the BNSF main line, which could result in the rezoning of industrial areas into other uses.



MDOT

0 0.3 0.6 0.9

Miles

Tupelo Mississippi Railroad Relocation Planning & Environmental Study

Zoning

Figure 4-2

4.1.2.3 Impacts to Overlay Districts

Nearly all of the downtown overlay districts are located within ½-mile of the BNSF main line.

No-Build Alternative

The downtown overlay districts would be preserved by the No-Build Alternative. No impacts to the downtown overlay districts would occur with the No-Build Alternative.

Build Alternative

The downtown overlay districts would be preserved by the Build Alternative. These districts would be better served by the alleviated congestion, and reduced noise which could be achieved by the Build Alternative. This also could potentially result in more economic investment and development for the downtown Tupelo area.

4.2 FARMLAND

The entire project is located within the city limits of Tupelo. There is little farmland, except for areas near the proposed interchange. In a letter dated March 19, 2008, included in **Appendix A**, the USDA NRCS stated that because the impacted farmlands are within the municipal boundaries of the City of Tupelo, they are not subject to the requirements of the FPPA. Therefore, Form AD-1006 would not be required and FPPA would not apply. In addition, the letter stated that no CRP, WRP, or GRP lands would be impacted with the Build Alternative.

4.3 ENVIRONMENTAL JUSTICE

Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations – provides guidance for addressing minority and low-income populations in association with NEPA. Actions should identify and address disproportionately high and adverse impacts to minority and low-income populations. Disproportionately high and adverse effect on minority and low-income populations is defined as:

- An adverse effect that is predominately borne by a minority population and/or a low-income population; or
- An adverse effect that will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

The race and ethnicity of the population of the study area were analyzed. According to *U.S. Department of Transportation (DOT) Order to Address Environmental Justice in Minority Populations and Low-Income Populations* (DOT Order OST-95-141 (50125), 1997), population groups defined as minorities include the following:

- Black (having origins in any of the black racial groups of Africa);

- Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture of origin, regardless of race);
- Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or
- American Indian and Alaskan Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

According to the 2000 Census data, Lee County is primarily White (76.6%). The largest minority population is Black (22.1%), with the remaining races comprising approximately 1% of the population (Native American [0.1%], Asian [0.4%], and two or more races [0.5%]). Hispanic persons comprise only 0.8% of the County's population. Based on the income threshold defined in **Section 3.4.3**, 41.2% of the population of Lee County is classified as low-income.

2000 Census data were reviewed at the County and Census block group levels to identify localized minority and low-income populations. A potential EJ concern could exist if the minority or low-income percentage of the population of a Census block group within ½-mile of the Build Alternative is significantly greater than the Lee County percentages. The Census data shows a very small percentage of minority households other than black households in these Census block groups. The minority populations other than black populations are small enough to remove specific EJ concerns for minority groups other than black. Therefore, only the black minority percentages were used to identify EJ concerns for Census block groups within ½-mile of the Build Alternative.

For minority populations, a potential EJ concern could exist if the minority population percentage for the Census block group is at least 50%. For low-income populations, a potential EJ concern could exist if the median household income for the Census block group was below 80% of the median household income of Tupelo, or a household income of $28,932 or less. The Census block groups within ½-mile of the Build Alternative were identified and tabulated for black households and low-income households, shown in **Table 4-3**.

Table 4-3 Potential Environmental Justice Concerns within ½-mile of Build Alternative

Census Tract	Block Group	Black Households		Low-Income Households	
		Percent	EJ Concern	Median Household Income	EJ Concern
9504 - Airport Area	1	9%	No	$47,639	No
	2	13%	No	$68,000	No
9505 - Park Hill/ Joyner/Downtown	1	4%	No	$41,801	No
	4	2%	No	$98,746	No
	5	7%	No	$61,010	No
9506 - Gravlee & Joyner	1	6%	No	$44,464	No
	2	0%	No	$50,822	No
	4	32%	No	$31,420	No
	5	23%	No	$26,063	**Yes**
9507 - Mill Village	1	51%	**Yes**	$18,966	**Yes**
	2	39%	No	$30,500	No
	3	31%	No	$28,519	**Yes**
9508 - Lee Acres	1	40%	No	$25,292	**Yes**

No-Build Alternative

The No-Build Alternative would leave the BNSF main line in its existing configuration, including all of the at-grade crossings. The No-Build Alternative would not adversely affect discrete minority or low-income populations because there are no improvements associated with the No-Build Alternative. Therefore, there are no EJ concerns associated with the No-Build Alternative.

Build Alternative

The improvements associated with the Build Alternative would primarily be contained within the existing BNSF right-of-way, except for the interchange area. The overall percentages of minority population (14%) and overall median household income within ½-mile of the Build Alternative are well below those of the total population of Lee County. There is one Census block group that contains a population that is 51% minority and four Census block groups that would be considered low-income. Because the improvements would be constructed within the existing BNSF right-of-way within these Census block groups, no minority or low-income households would need to be relocated and no disproportionate adverse effects would occur. The potential adverse effects associated with the Build Alternative of visual obstruction and increased vibration would not be limited to these minority and/or low-income areas; they would be experienced along the entire corridor. As documented in the NVA, the Build Alternative would benefit these and other neighborhoods by greatly reducing train noise and reducing traffic delay by removing the at-grade crossings. Since the adverse impacts to minority and low-income households would not be disproportionate, there are no EJ concerns associated with the Build Alternative.

4.4 PUBLIC FACILITIES AND COMMUNITY COHESION

4.4.1 Neighborhoods

The following neighborhoods are either bisected or directly adjacent to the BNSF main line, shown on **Figure 4-3**:

- Gravlee
- Joyner
- Historic Downtown

No-Build Alternative

The BNSF main line bisects the Gravlee Neighborhood, runs through the southernmost portion of the Downtown Neighborhood, forms the western boundary of the Joyner Neighborhood, and forms the northern boundary of the Mill Village Historic District. While no construction or visual impacts would be experienced for these neighborhoods, the increased delay resulting from the at-grade crossings and other rail-associated environmental conflicts would remain.

Build Alternative

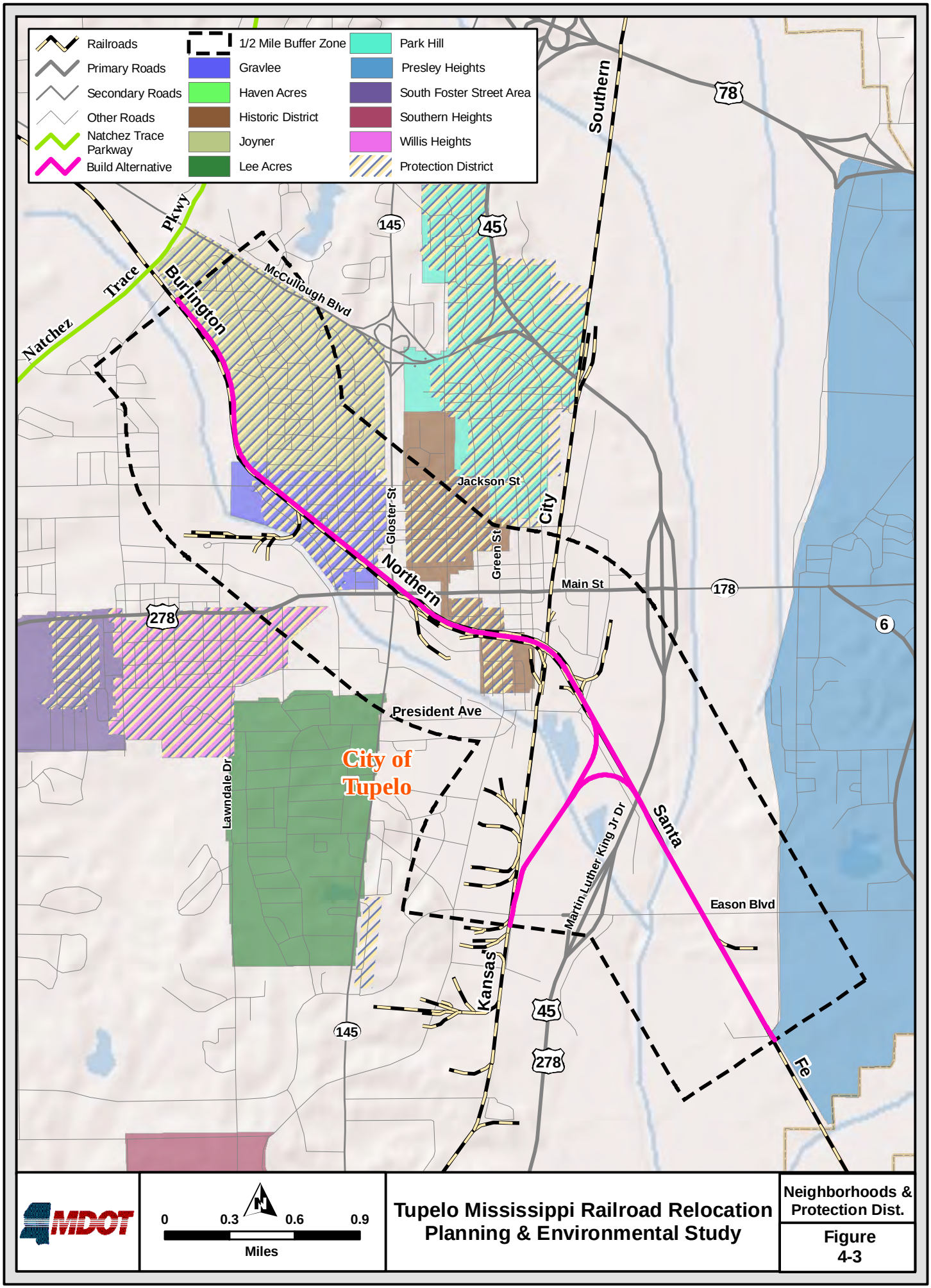
Elevating the existing railroad would improve these neighborhoods in terms of noise and traffic impacts. However, visual impacts within the Mill Village Historic District, the South Church Street Historic District, and the Downtown Historic District are anticipated due to the elevated corridor and are discussed in **Section 4.5**. The elevated rail structure would range in height from 20 to 30 feet. The existing residential zones allow for structures that are 35 feet high. Therefore, the elevated rail structure would conform to those zoning guidelines. Context sensitive solutions (such as public art, lighting, landscaping, and type of materials) would need to be applied to reduce these visual impacts.

4.4.2 Schools

The BNSF main line passes most closely to the Joyner Avenue Elementary School north of the Jackson Street crossing and the Milam Elementary School just north of the Crosstown intersection, shown on **Figure 4-4**. The grounds of Joyner Avenue Elementary School are adjacent to the BNSF main line.

No-Build Alternative

With horn sounding required at at-grade crossings for the No-Build Alternative, these schools are affected by approximately 23 trains per day, estimated to increase to approximately 40 trains per day by 2030. Therefore, the No-Build Alternative is anticipated to result in increased noise levels, which could adversely affect the learning environment at both Joyner Avenue Elementary School and Milam Elementary School as the train traffic increases.


Railroads
Primary Roads
Secondary Roads
Other Roads
Natchez Trace Parkway
Build Alternative
1/2 Mile Buffer Zone
Gravlee
Haven Acres
Historic District
Joyner
Lee Acres
Park Hill
Presley Heights
South Foster Street Area
Southern Heights
Willis Heights
Protection District
Natchez Trace Pkwy
Burlington Northern Santa Fe
McCullough Blvd
Jackson St
Gloster St
Green St
City
Southern
Main St
President Ave
Lawndale Dr
Martin Luther King Jr Dr
Eason Blvd
Kansas
City of Tupelo
78
45
145
178
278
6
0 0.3 0.6 0.9
Miles
Tupelo Mississippi Railroad Relocation Planning & Environmental Study
Neighborhoods & Protection Dist.
Figure 4-3

Build Alternative

The Build Alternative would reduce the horn soundings and result in less noise disruption around these schools, which could result in a better learning environment. In addition, by removing the at-grade crossings, safer vehicle and pedestrian routes would be created.

4.4.3 Churches and Cemeteries

There are 58 churches and 12 cemeteries within the city limits of Tupelo. Of these, 12 churches and two cemeteries are within ½-mile of the BNSF main line, shown on **Figure 4-4**.

No-Build Alternative

The No-Build Alternative would leave the existing BNSF main line at-grade, including all of the at-grade road crossings. The trains would continue to sound their horns. Churches and cemeteries, especially those within ½-mile of the BNSF main line, would continue to experience disruption in services and other functions due to noise, vibration, and traffic delays in their vicinity, which would worsen as the train traffic increases.

Build Alternative

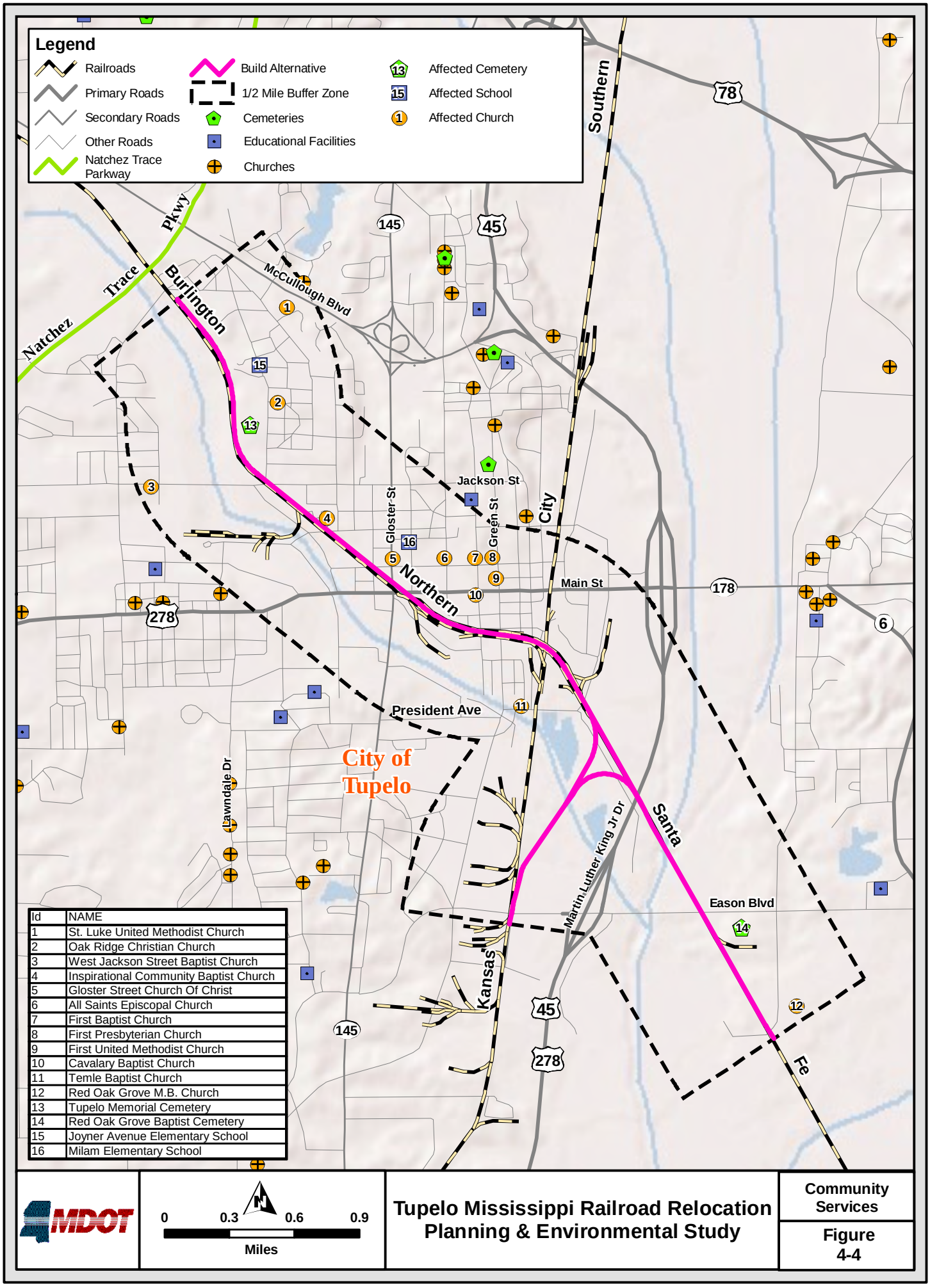
The Build Alternative would reduce noise disruption through downtown Tupelo, which will benefit both church and cemetery activities. The Red Oak Grove Baptist Cemetery on Eason Boulevard would adjoin the eastern edge of the proposed frontage road adjacent to the roadway overpass, shown in the concept plans in **Appendix D**, but the impact to the property is anticipated to be minimal, as the right-of-way acquisition area is on the periphery of the parcel and does not affect any gravesites. The impact can be further minimized through the use of other noise abatement measures, examples of which are discussed in the NVA, which would be determined during the final design phase.

4.4.4 Public Facilities

Public facilities within the City of Tupelo include city and government buildings such as the Lee County Courthouse and Tupelo City Hall, events centers such as the BancorpSouth Arena and Lyric Theater, attractions and museums such as the Elvis Presley home and driving tour and the Tupelo Automobile Museum, and retail establishments such as the Barnes Crossing Mall and the Tupelo Furniture Market.

No-Build Alternative

The increased train traffic could cause disruption of civic services and public activities caused by more frequent train noise and horn soundings as a result of the No-Build Alternative. In addition, access to these facilities would be hindered by the increased traffic delays associated with the existing at-grade crossings.



Id	NAME
1	St. Luke United Methodist Church
2	Oak Ridge Christian Church
3	West Jackson Street Baptist Church
4	Inspirational Community Baptist Church
5	Gloster Street Church Of Christ
6	All Saints Episcopal Church
7	First Baptist Church
8	First Presbyterian Church
9	First United Methodist Church
10	Cavalary Baptist Church
11	Temle Baptist Church
12	Red Oak Grove M.B. Church
13	Tupelo Memorial Cemetery
14	Red Oak Grove Baptist Cemetery
15	Joyner Avenue Elementary School
16	Milam Elementary School

Build Alternative

The public facilities which lie within ½-mile of the Build Alternative include:

- West Main Shopping Center
- Willow Bend Village Shopping Center
- Gloster Creek Village Shopping Center
- Tupelo Public Library
- Tupelo Post Office and Federal Building
- Tupelo City Hall
- Lee County Courthouse
- Tupelo Artist Guild
- Lyric Theatre
- Tupelo Convention and Visitors Bureau
- BancorpSouth Arena
- VF Factory Outlet Stores

The Build Alternative would directly affect the VF Factory Outlet Stores on Eason Boulevard. The Build Alternative would require approximately 0.3 acres of right-of-way acquisition from the property and the redirection of traffic flow to and from the property, shown on the concept plans in **Appendix D**. The right-of-way acquisition would not disturb any structures or parking on the VF property. In addition, a new driveway access from the property to Veterans Boulevard would be constructed to mitigate the access to the VF Factory Outlet Stores.

The Build Alternative would remove traffic delays associated with the existing at-grade crossings. Context sensitive solutions (such as public art, lighting, landscaping, and type of materials), as agreed upon in the MOA, included in **Appendix F**, would be applied to reduce visual impacts of the elevated rail through the city center areas.

4.4.5 Parks and Recreation

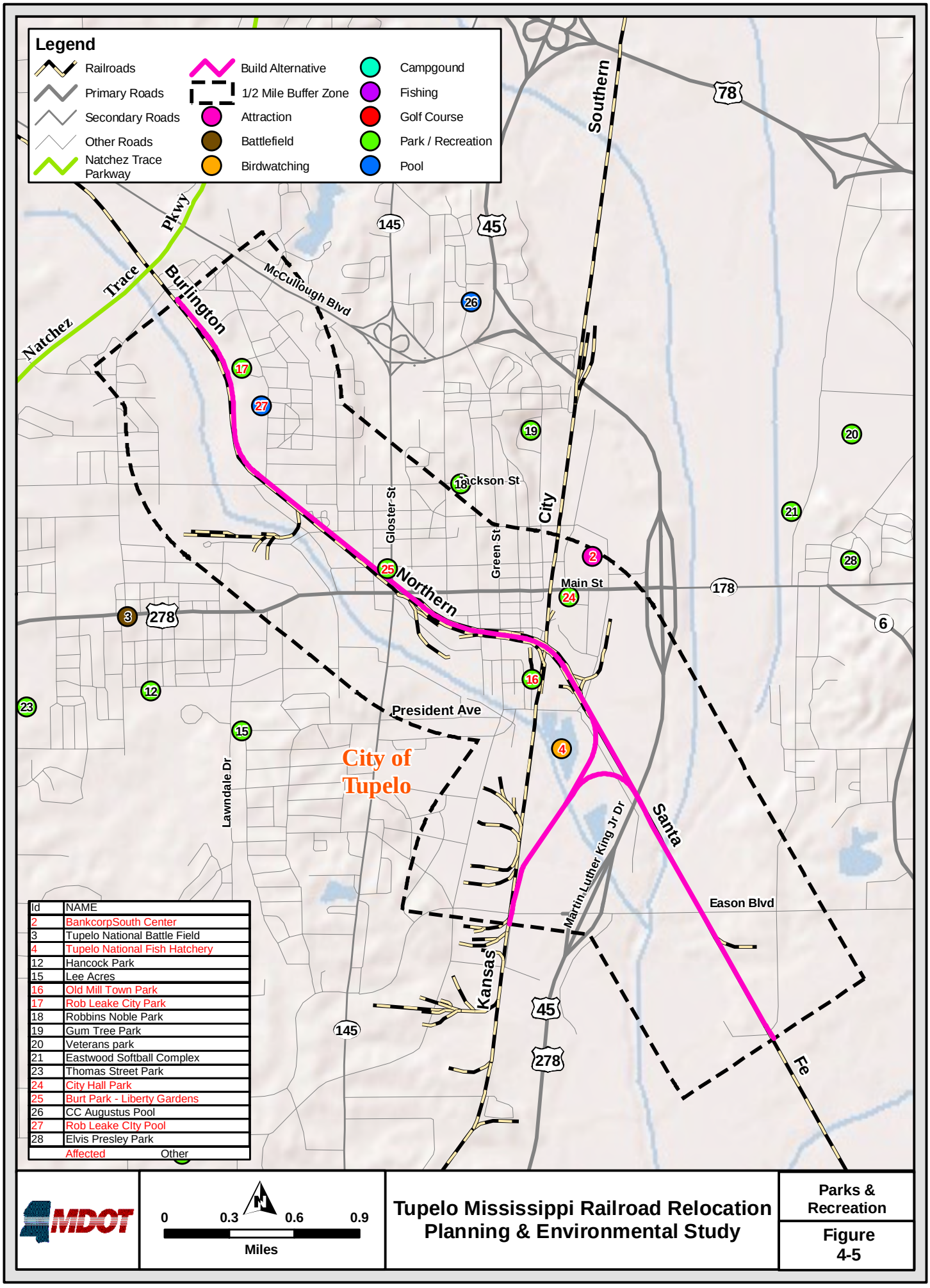
Several parks and recreational facilities are adjacent to the existing BNSF right-of-way: the Pvt. John Allen National Fish Hatchery, the Natchez Trace Parkway and National Scenic Trail, the Burt Park Liberty Gardens, and the Rob Leake City Park, shown on **Figure 4-5**.

No-Build Alternative

The No-Build Alternative would not result in impacts to parks and recreation facilities.

Build Alternative

Since the Build Alternative improvements would be within the existing BNSF right-of-way, there would be no physical impacts to any public parks or recreational facilities. However, visual impacts are anticipated due to the elevated corridor. These impacts are discussed further in **Section 4.15**.


Legend
Railroads
Primary Roads
Secondary Roads
Other Roads
Natchez Trace Parkway
Build Alternative
1/2 Mile Buffer Zone
Attraction
Battlefield
Birdwatching
Campgound
Fishing
Golf Course
Park / Recreation
Pool
Southern
78
145
45
Pkwy
Trace
Natchez
Burlington
McCullough Blvd
26
17
27
19
20
Jackson St
18
Gloster St
City
Green St
21
2
28
25
Northern
Main St
24
178
3
278
6
16
12
23
President Ave
15
4
City of Tupelo
Lawndale Dr
Martin Luther King Jr Dr
Santa
Eason Blvd
Kansas
45
145
278
Fe
Id NAME
2 BankcorpSouth Center
3 Tupelo National Battle Field
4 Tupelo National Fish Hatchery
12 Hancock Park
15 Lee Acres
16 Old Mill Town Park
17 Rob Leake City Park
18 Robbins Noble Park
19 Gum Tree Park
20 Veterans park
21 Eastwood Softball Complex
23 Thomas Street Park
24 City Hall Park
25 Burt Park - Liberty Gardens
26 CC Augustus Pool
27 Rob Leake City Pool
28 Elvis Presley Park
Affected
Other
MDOT
N
0 0.3 0.6 0.9
Miles
Tupelo Mississippi Railroad Relocation Planning & Environmental Study
Parks & Recreation
Figure 4-5

Parks and recreation facilities would benefit from the Build Alternative through the removal of many of the at-grade crossings within the City of Tupelo. This would improve the access to the parks and recreational facilities. In addition, the elevated corridor would reduce the noise impacts throughout the City as trains would not need to sound the horn at at-grade crossings. The elevated corridor would also increase the safety of these parks by making the railroad inaccessible to pedestrians.

4.4.6 Medical and Emergency Services

The locations of Tupelo's major health care facilities, police stations, and fire stations are discussed in detail in **Section 3.5.6**.

No-Build Alternative

The No-Build Alternative would not result in adverse impacts to medical, fire, or police services in the study area. However, future growth unrelated to this project is expected. Without facilities to address the potential delays caused by trains at at-grade crossings, emergency response times are expected to increase, which would hinder emergency response capabilities.

Build Alternative

The Build Alternative would not result in adverse public health impacts to medical, fire, or police services in the study area. The Build Alternative is expected to benefit public health and emergency services in the study area by improving emergency response times through the removal of at-grade crossings in the downtown Tupelo area. The removal of the at-grade crossings at Crosstown and across Eason Boulevard would enhance the ability of those emergency services to respond and transport more rapidly.

4.4.7 Travel Patterns and Accessibility

The at-grade crossings and nearby intersections were evaluated for both the No-Build and Build Alternatives. The average vehicle delay experienced at the at-grade crossings was calculated for each crossing. Vehicle delay includes two components, the delay occurring at the at-grade rail crossings and the delay experienced by vehicles at nearby intersections. The latter component is considered because the queuing of vehicles at the at-grade crossing locations can extend into several nearby intersections and potentially impede traffic flow on other streets in the traffic network. This is considered a secondary delay related to crossing events. The LOS is a letter designation that describes a range of traffic operating conditions on a particular facility. Six levels of service are defined by the HCM for capacity analysis. They are given letter designations A through F, with LOS A representing ideal operating conditions and LOS F the worst.

The queuing model is based on the procedures contained in the HCM. Since there is not a fixed train schedule, the train volume was generally assumed to be uniformly distributed throughout the day. The arrival rate of vehicles approaching each at-grade crossing location is also assumed to be uniform. Vehicles start to queue at each

crossing whenever a train approaches the crossing. In addition to the train crossing events, a switching operation is performed daily between the BNSF main line and the KCS rail line. This creates severe delays at several crossings including Crosstown. The purpose of the switching operation is to allow train cars from the main line to be transferred to spur tracks and be delivered to the local industry destinations. Due to the lack of electronic lock switching, this operation typically takes 10 minutes to complete.

Each at-grade crossing was evaluated as a signalized intersection based on the HCM. The delay time, queuing length, and the LOS were determined using a computer-generated traffic model by the VISSIM traffic simulation computer software program. VISSIM is a micro-simulation program capable of analyzing and modeling complex traffic conditions on highway and street networks.

The 2005 and projected 2030 peak hour LOS for at-grade railroad crossings in the affected environment are shown in **Table 4-4**. The 2005 and projected 2030 peak hour LOS for various intersections near at-grade railroad crossings during the peak hour are shown in **Table 4-5**.

Table 4-4 At-Grade Crossing Peak Hour LOS

Railroad	Crossing Street Name	2005 Crossing LOS	2030 Crossing LOS (No-Build)	2030 Crossing LOS (Build)
BNSF	Lumpkin Ave.	B	D	D
	Jackson St.	B	D	A*
	Blair St.	B	D	A*
	Jefferson St.	B	D	A*
	Park St.	B	D	A*
	Gloster St.	B	E	A*
	Main St.	B	D	A*
	Church St.	B	D	A*
	Green St.	B	D	A*
	Spring St.	B	D	A*
	Elizabeth St.	C	F	A*
	Eason Blvd.	C	F	A*
KCS	Eason Blvd.	A	A	A*
	Elizabeth St.	A	A	A
	Main St.	A	A	A
	Jefferson St.	A	A	A

*LOS A assumed due to grade-separated crossing

Table 4-5 Nearby Intersection Peak Hour LOS

Intersection	2005 LOS	2030 LOS With Trains (No-Build)	2030 LOS Without Trains (Build)
Clark St. at Church St.	D	C	A
Gloster St. at Main St.	F	F	F
Clark St. at Spring St.	C	C	B
Spring St. at Elizabeth St.	B	C	A
Front St. at Main St.	B	B	B
Front St. at Jefferson St.	A	B	B
Park St. at Jefferson St.	D	E	C
Rankin St. at Blair St.	C	C	A
Rankin St. at Jackson St.	C	D	A
Eason Blvd. at Ryder St.	B	C	A
Eason Blvd. at Whitaker St.	A	A	A
Gloster St. at Jefferson St.	C	F	B

No-Build Alternative

Under the No-Build Alternative, each at-grade crossing along the BNSF main line would exhibit unfavorable (D) or unacceptable (E or F) LOS by the year 2030. In addition, most of the nearby intersections' LOS would fall at least one letter-grade by the year 2030.

Build Alternative

The construction of the Build Alternative would remove train traffic from the roadway network by creating grade separations between the roadway and railroad. This not only would remove most of the traffic delay at the at-grade intersections within Tupelo, but it would also improve the LOS of almost all of the nearby intersections to LOS C or better. The exception would be the intersection of Gloster Street at Main Street, which is projected to be over capacity during the peak hour, even without train crossing disruptions. The intersection appears to have capacity issues that should be addressed with other refinements, such as signal timing adjustments and addition of turning lanes.

4.5 CULTURAL RESOURCES

4.5.1 Archaeological and Historic Sites

The APE for the affected environment is defined as that area within the existing BNSF right-of-way and an approximate 500-foot buffer on each side of the existing right-of-way, as well as a 500-foot buffer on each side of the right-of-way for the proposed interchange. The buffer width was coordinated with MDAH to account for possible visual or noise impacts. As documented in the *Cultural Resources Investigations for the Tupelo Railroad Relocation Study* (Brockington, January 2009) three previously unrecorded archaeological sites and 58 architectural resources (thirty previously recorded and 28 previously unrecorded) were located within or adjacent to the APE.

At the previously unrecorded archaeological site located just east of the intersection of Jefferson Street and the BNSF main line, shovel tests produced a light density of archaeological materials dating to the late nineteenth and early twentieth century, indicating the presence of a domestic structure. The site had been disturbed and dates to a relatively recent time period. The previously unrecorded archaeological site located within the BNSF right-of-way just south of Jackson Street and was identified by the presence of historic debris, which was considered to be the result of incidental trash dumping rather than an archaeological site. The previously unrecorded archaeological site located in the proposed interchange area just south of the Pvt. John Allen Fish Hatchery, consists of two sewer manholes.

Of the 58 architectural resources documented, 13 had been demolished and three are currently listed on the NRHP: the Pvt. John Allen Fish Hatchery Superintendant's House, the Mill Village Historic District, and the South Church Street Historic District. In a letter dated March 17, 2009, included in **Appendix A**, coordination with the SHPO determined that of the remaining 42 architectural resources not NRHP-listed or demolished, 35 were deemed eligible for listing with NRHP. The SHPO determined that these 35 NRHP-eligible individual properties or historic districts appear to retain their historic architectural integrity.

No-Build Alternative

The No-Build Alternative would not result in impacts to historic or archaeological sites.

Build Alternative

With the Build Alternative, all construction activities would take place within the existing BNSF right-of-way, except for the proposed interchange. No NRHP-listed or NRHP-eligible properties would be directly impacted by project construction, demolition, or removal of NRHP contributing features. In a letter dated March 17, 2009, included in **Appendix A**, coordination with the SHPO determined that the Build Alternative would not affect any NRHP-listed archaeological sites and additional archaeological sites were not likely to be encountered. However, the SHPO did determine that the Build Alternative has potential to adversely affect 37 NRHP-listed or NRHP-eligible properties, shown on **Figure 4-6** and in **Table 4-6**, by altering their existing viewsheds. The FRA, SHPO, MDOT, and the City of Tupelo, have been consulted pursuant to Section 106 of the National Historic Preservation Act to discuss appropriate measures to mitigate these visual impacts. These proposed measures are contained in the draft MOA between the interested parties, included in **Appendix F**, and will be binding when the final MOA is signed and the project advances into final design and construction.

Although the Project has received archaeological clearance from SHPO, the possibility exists that evidence of cultural resources may yet be encountered within the project limits. Should any evidence of cultural resources be discovered during

Under the authority of Section 304 of the National Historic Preservation Act, this map is not for public disclosure due to the sensitive nature of identified cultural resources.

Table 4-6 Affected NHRP-Listed and -Eligible Sites within the APE

Resource	Type	NRHP Status	Project Effect	Resource	Type	NRHP Status	Project Effect
Pvt. John Allen Fish Hatchery Superintendant's House	House	Listed	Not Adverse	541 Magazine St.	House	Eligible	Adverse
Mill Village Historic District	District	Listed	Adverse	543 Magazine St.	House	Eligible	Adverse
South Church Street Historic District	District	Listed	Adverse	555 Magazine St.	House	Eligible	Adverse
North Tupelo Neighborhood District	District	Eligible	Adverse	557 Magazine St.	House	Eligible	Adverse
Joyner Neighborhood District	District	Eligible	Adverse	561 Magazine St.	House	Eligible	Adverse
Gravlee Neighborhood District	District	Eligible	Adverse	331 Park St.	House	Eligible	Adverse
Carnation Condensary	Industrial	Eligible	Adverse	623 Main St.	Commercial	Eligible	Adverse
TVA 'Tupelo' Sign	Sign	Eligible	Adverse	627 Main St.	House	Eligible	Adverse
308 S. Broadway	Industrial	Eligible	Adverse	631 Main St.	House	Eligible	Adverse
400 S. Broadway (Tupelo Oil & Ice Office)	Industrial	Eligible	Adverse	634 Main St.	Apartment	Eligible	Adverse
314 S. Church St.	House	Eligible	Adverse	637 Main St.	House	Eligible	Adverse
317 S. Church St.	House	Eligible	Adverse	640 Main St.	House	Eligible	Adverse
319 S. Church St.	House	Eligible	Adverse	641 Main St.	House	Eligible	Adverse
525 S. Church St.	House	Eligible	Adverse	646 Main St.	House	Eligible	Adverse
529 S. Church St.	House	Eligible	Adverse	123 S. Gloster St.	Commercial	Eligible	Adverse
105 Clark Pl.	House	Eligible	Adverse	208 N. Gloster St.	House	Eligible	Adverse
812 Jefferson St.	House	Eligible	Adverse	218 N. Gloster St.	House	Eligible	Adverse
405 Magazine St.	House	Eligible	Adverse	110 Robbins St.	House	Eligible	Adverse
411 Magazine St.	House	Eligible	Adverse	311 S. Green St.	House	Eligible	Adverse

construction activities, all work in that portion of the project area would stop. Representatives of MDOT will assist in the identification and preliminary assessment of the materials. If such evidence is found, the MDAH will be notified within two working days.

In the unlikely event that human skeletal remains or associated burial artifacts are uncovered within the project area, all work in that area would stop. The discovery must be reported to local law enforcement, who will in turn contact the medical examiner. MDAH must be contacted.

While there are no direct impacts to any cultural resources, there is a potential impact during construction to the TVA "Tupelo" sign at the Crosstown intersection, shown below. The sign could require special consideration to preserve its historic character during the construction of the truss bridge across the intersection. Even though the sign is not currently a NRHP-listed resource, it is eligible for listing with the NRHP. Although the Build Alternative would not require relocation of the sign, its existing position lies within a traffic island almost directly underneath the proposed bridge span across the intersection. The SHPO will be consulted during construction to determine whether the sign is adversely affected and if so, mitigation efforts, which could include temporary relocation to avoid damage during construction. Additionally, mitigation for the sign could be added to the provisions of the MOA, included in **Appendix F**.

TVA "Tupelo" Sign at the Crosstown Intersection

4.5.2 Native American Resources

The Tupelo area was once home to the Chickasaw Nation, meaning the entire affected environment can be regarded as Native American lands. While the existing BNSF main line does not run through any known Native American resources within the City of Tupelo, soil corings were performed at 21 locations along the Build Alternative alignment to identify any previously unrecorded Native American archaeological resources.

The soil corings revealed that the soils within the BNSF right-of-way east of Gloster Street were heavily disturbed from industrial and cultural activities. These areas contain minimal potential for cultural deposits. The BNSF right-of-way west of Gloster Street was found to contain intact, natural soils, and was then further recommended for systematic shovel tests to determine any archaeological value. The shovel tests found no cultural or Native American resources of any architectural value.

No-Build Alternative

The No-Build Alternative would not result in any impacts to Native American resources.

Build Alternative

No artifacts were found within the soil corings or shovel tests conducted along the BNSF main line. Further coordination with the Chickasaw Nation, SHPO and MDAH resulted in each entity granting archaeological clearance for the Build Alternative. However, the presence of intact and natural soils within the BNSF right-of-way provides the possibility for intact cultural resources and the remote possibility exists to recover Native American resources, despite the heavy disturbance of the area.

Should any evidence of cultural resources be discovered during construction activities, all work in that portion of the project would stop. Representatives of MDOT will assist in the identification and preliminary assessment of the materials. If such evidence is found, MDAH would be notified within two working days.

In the unlikely event that human skeletal remains or associated burial artifacts are uncovered within the project area, all work in that area would stop. The discovery must be reported to local law enforcement, who in turn, will contact the medical examiner. MDAH will also be contacted.

4.6 AIR QUALITY

The total delay times for the year 2030, without train traffic at the affected crossings, were calculated as part of the *Phase 1 Feasibility Analysis* (HDR, May 2006). The emission reductions for the year 2030, shown in **Table 4-7**, were calculated by multiplying the total net delay hours for all of the affected at-grade crossings and nearby intersections by the motor vehicle fleet-average emission factors generated by the EPA MOBILE6.2 emissions model. The MOBILE6.2 factors were generated based on annual average climate conditions for Tupelo and by assuming a national average fleet mix in terms of vehicle types, ages, and mileage accumulation rates.

Table 4-7 Emission Reduction in Year 2030 from Auto Traffic Delay

Pollutant	Reduced Emissions No-Build Alternative (tons/yr)	Reduced Emissions Build Alternative (tons/yr)
CO	--	18.75
NO_x	--	0.66
PM	--	0.07
SO_2	--	0.01
VOC	--	2.86

Notes
1) Emission reduction calculated based on estimated hours of traffic delay removed by Build Alternative at at-grade and nearby intersections. (704,000 hrs/yr)
2) MOBILE 6.2 assumed emission factors for national fleet averages for year 2030 at a speed of 3.1 miles/hr under Tupelo climate conditions.

No-Build Alternative

The current EPA designations have Lee County, Mississippi as in attainment of the NAAQS for all criteria pollutants. Based on the monitoring data, it does not appear that the area is likely to become a nonattainment area in the foreseeable future. However, there would be an increase in pollutants as a result of the increased auto traffic delay associated with the No-Build Alternative.

Build Alternative

The Build Alternative is expected to result in a slight benefit to air quality. This slight benefit is attributed primarily to elimination of some delays of motor vehicles that would otherwise idle near highway/rail at-grade crossings while waiting for trains to pass.

The emissions decreases, shown in **Table 4-7**, are small in comparison to emissions from major stationary emissions sources. However, these reductions provide a slight benefit to the area and more so at locations near the affected crossings, where vehicles would otherwise idle waiting for trains to pass.

Another benefit of the proposed project is that it would enhance train speeds and movement of rail freight through the Tupelo area. While the emissions benefits of operation improvements have not been quantified, these improvements are expected to result in reduced fuel use and reduced emissions from locomotives operating on the rail line.

In addition to operation-related emissions decreases, there would be some temporary air pollutant emissions increases during the construction period. These emissions would result from construction equipment engine exhaust and from fugitive dust that may be suspended from exposed soils prior to re-vegetation. However, given the temporary and diffuse nature of such emissions, they are not expected to have a major impact on air quality in the Tupelo area.

4.7 NOISE AND VIBRATION

4.7.1 Noise

As documented in the NVA, included in **Appendix E**, predicted noise levels for future operation of the No-Build and Build Alternatives for the BNSF main line and the KCS rail line through Tupelo were modeled using the measurements of noise from the existing rail line. As discussed in **Section 3.8.1**, those noise measurements consisted of 24-hour measurements at seven locations within the City of Tupelo and short-term measurements at two locations within 50 feet of the existing BNSF main line. The noise levels recorded from the train pass-bys were used to calculate the average noise generated by a single train. The future noise levels were then predicted at representative sensitive receptors based on the estimated future train volumes, consists, and speeds. These noise models also considered the propagation path of the noise between the source and the receptors, including ground cover, physical obstructions, and elevations.

Train volumes are predicted to increase to approximately 40 trains per day on the BNSF main line through Tupelo and to approximately four trains on the KCS rail line by the year of 2030. The No-Build and Build Alternatives were modeled using the projected train traffic data, with train consist information as shown in **Table 4-8**, to determine the wayside noise impact contours and to the grade-crossing noise impact contours where train horns are used.

As documented in the NVA, included in **Appendix E**, once the noise model contours were established for the year 2030, the affected receptors and impacted areas within the City of Tupelo were identified within each level of noise impact for both the No-Build and Build Alternatives, based on the FTA/FRA noise impact criteria defined in **Section 3.8.1**.

Table 4-8 Existing and Future Train Volumes and Consists

Service Line and Type	Average Existing Daily Train Traffic (2005)			Average Future Daily Train Traffic (2030)		
	Trains	Engines per Train	Cars per Train	Trains	Engines per Train	Cars per Train
BNSF - Coal	8	5	135	13	6	160
BNSF - Freight	16	3	125	28	4	150
KCS - Through	1	2	95	3	3	110
KCS - Local	1	1	25	2	1	25

Source: *Noise and Vibration Analysis* (HDR, 2008)

The comparison was based on the area adjacent to the improvements recommended in the Build Alternative, as the noise in unimproved areas adjacent to the BNSF main line was assumed to be identical for both the Build Alternative and the No-Build Alternative. The receptor sites were identified using aerial and GIS data as existing structures and did not include any future development. The noise contours were used to estimate an area of impact for both moderate impacts and severe impacts. The summary of the predicted noise impacts is shown in **Table 4-9**.

Table 4-9 Predicted FTA/FRA Noise Impacts

Alternative	Total Predicted Impacted Sites	Moderate Noise Impact Sites	Severe Noise Impact Sites	Impact Reduced Sites	Impact Removed Sites	Total Noise Impact Area (Acres)	Severe Noise Impact Area (Acres)
No-Build Alternative	414	286	128	N/A	N/A	1,134	457
Build Alternative	385	309	76	23	29	1,093	395

Source: *Noise and Vibration Analysis* (HDR, 2008)

No-Build Alternative

A total of 414 noise impacted sites within the comparison area of the City of Tupelo, shown on **Figure 4-7**, were identified for the No-Build Alternative in the year 2030. Of these sites, 128 were determined to be considered severely impacted (as defined by the FTA/FRA, discussed in **Section 3.8.1**). In the comparison area, a total of 1,134 acres would experience a noise impact, including 457 acres that would experience a severe noise impact.

Build Alternative

A total of 385 noise impacted sites within the City of Tupelo, shown on **Figure 4-8**, were identified for the Build Alternative in the year 2030. Of these sites, 76 were determined to be severely impacted. The Build Alternative offers a reduction of 29 noise-impacted sites compared to the No-Build Alternative, and an additional 23 sites

experience a reduction of the noise impact designation from severe to moderate (as defined by the FTA/FRA noise criteria, as discussed in **Section 3.8.1**). The Build Alternative also removes, approximately 41 acres from having any noise impact and approximately 62 acres would move from being severely impacted to only being moderately impacted by train events as compared to the No-Build Alternative. All of the noise impacted sites and areas identified for the Build Alternative are also predicted to experience train noise levels that exceed FTA/FRA noise impact thresholds, as discussed in **Section 3.8.1**, under the No-Build Alternative, so the Build Alternative would not result in any additional noise impacts to any receiver as compared to the No-Build Alternative. The Build Alternative would result in the BNSF trains operating through Tupelo without sounding their horns between Lumpkin Avenue and Veteran's Boulevard, a distance of nearly five miles. The Build Alternative would result in a sizeable benefit to the reduction of train-related noise through Tupelo.

The substantial reduction of horn noise and increase in path length between the source and receivers both greatly reduce the noise generated by the trains on the BNSF main line as compared to the No-Build Alternative. However, the train noise, specifically wheel noise and engine noise would not be eliminated within downtown Tupelo. Additional options for further mitigating the noise levels predicted for the Build Alternative would be evaluated during the final design phase.

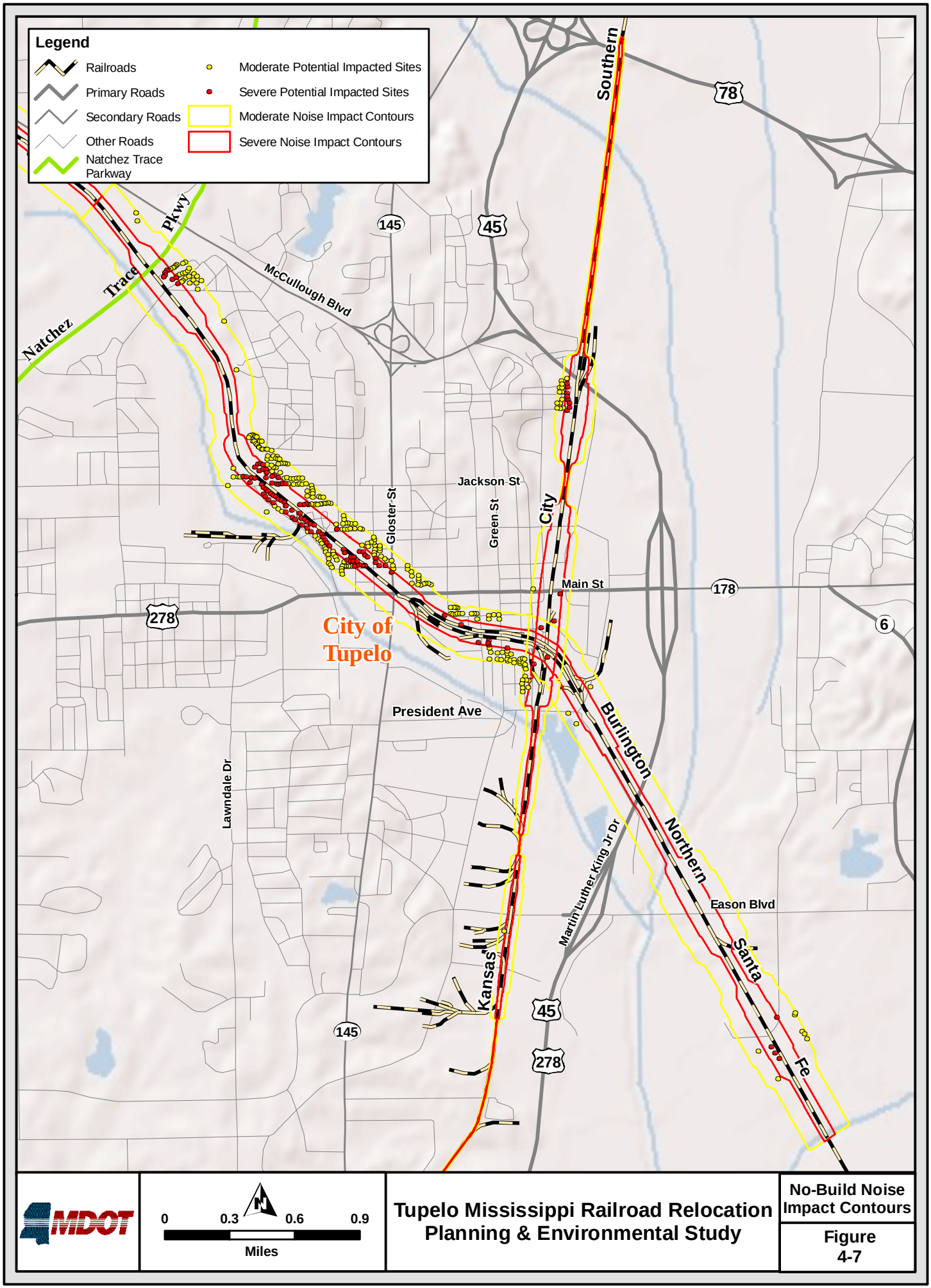
4.7.2 Vibration

To estimate potential vibration effects from the future No-Build and Build Alternatives, the FTA General Vibration Assessment methodology was applied to develop a prediction curve of vibration velocity as a function of distance from the tracks. This curve was used to estimate future vibration levels at each vibration sensitive receptor that were compared to the FTA vibration impact thresholds, as discussed in **Section 3.8.2**.

Vibration impacts are determined based on train speed and average number of vibration events during single train pass-bys. Therefore, distances to residential impacts changed where track upgrades are proposed as well as where the predicted speed and number of events changed.

The General Vibration Assessment uses generalized data to develop a curve of vibration levels as a function of distance from the track. The vibration levels at specific buildings are estimated by reading values from the curve and applying adjustments to account for factors such as track support system, vehicle speed, type of building, and track and wheel condition.

Once the base curve has been selected, adjustments are used to develop vibration projections for specific receiver positions. The adjustment parameters include speed, wheel and rail type and condition, type of track support system, type of building foundation, geologic conditions, and number of floors above the basement level.


Legend
Railroads
Primary Roads
Secondary Roads
Other Roads
Natchez Trace Parkway
Moderate Potential Impacted Sites
Severe Potential Impacted Sites
Moderate Noise Impact Contours
Severe Noise Impact Contours
Southern
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Pkwy
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Natchez
McCullough Blvd
Jackson St
Gloster St
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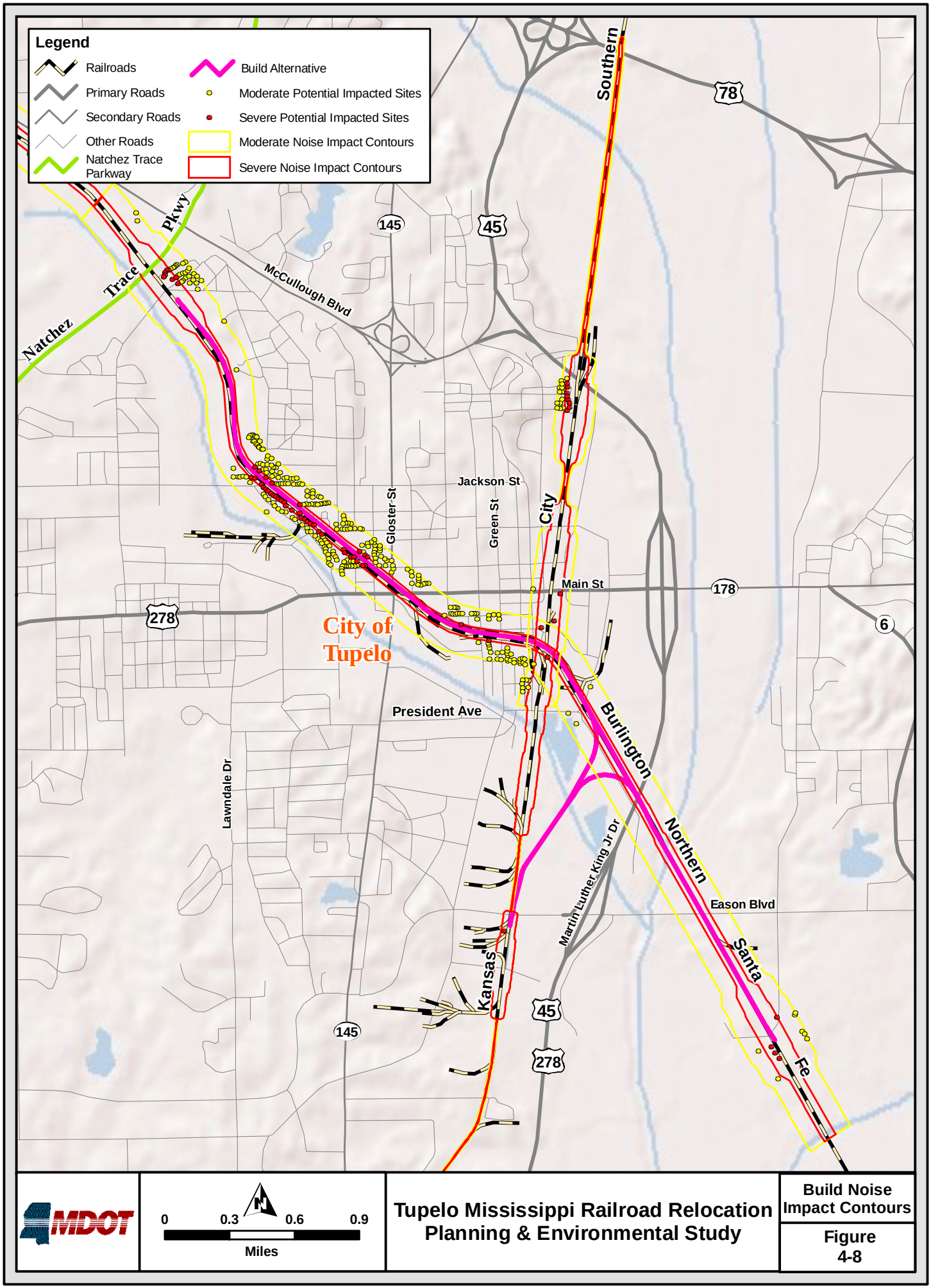
Tupelo Mississippi Railroad Relocation Planning & Environmental Study
No-Build Noise Impact Contours
Figure 4-7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Railroads
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Secondary Roads
Other Roads
Natchez Trace Parkway
Build Alternative
Moderate Potential Impacted Sites
Severe Potential Impacted Sites
Moderate Noise Impact Contours
Severe Noise Impact Contours
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Jackson St
Gloster St
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Tupelo Mississippi Railroad Relocation Planning & Environmental Study
Build Noise Impact Contours
Figure 4-8

The adjustments for the BNSF main line for the No-Build and Build Alternatives were considered identical. However, train speeds varied along the BNSF main line and the General Vibration Assessment applied lower adjustments to the slower train movements. In addition to the adjustment for train speed, a conservative adjustment for ground-borne propagation effects was applied to account for efficient propagation of the vibration between the source and the receptors within the City of Tupelo. This adjustment adds 10 VdB to each of the vibration projections. Because the adjusted vibration level for the locomotives is more than 10 VdB greater than the vibration level for the railcars, the railcar component of the vibration has been eliminated from further discussion.

The difference between the adjusted vibration level at the screening distance and the impact threshold was then used to determine the distance to the impact contour line. The distance to the vibration impact contour line for residential land uses was determined to range from 60 to 170 feet from the BNSF main line, with the variation due to the range of operating speeds, and 76 feet from the KCS rail line. For industrial land uses near the proposed interchange between the BNSF and KCS the vibration contour was determined to be 110 feet from the interchange track centerline.

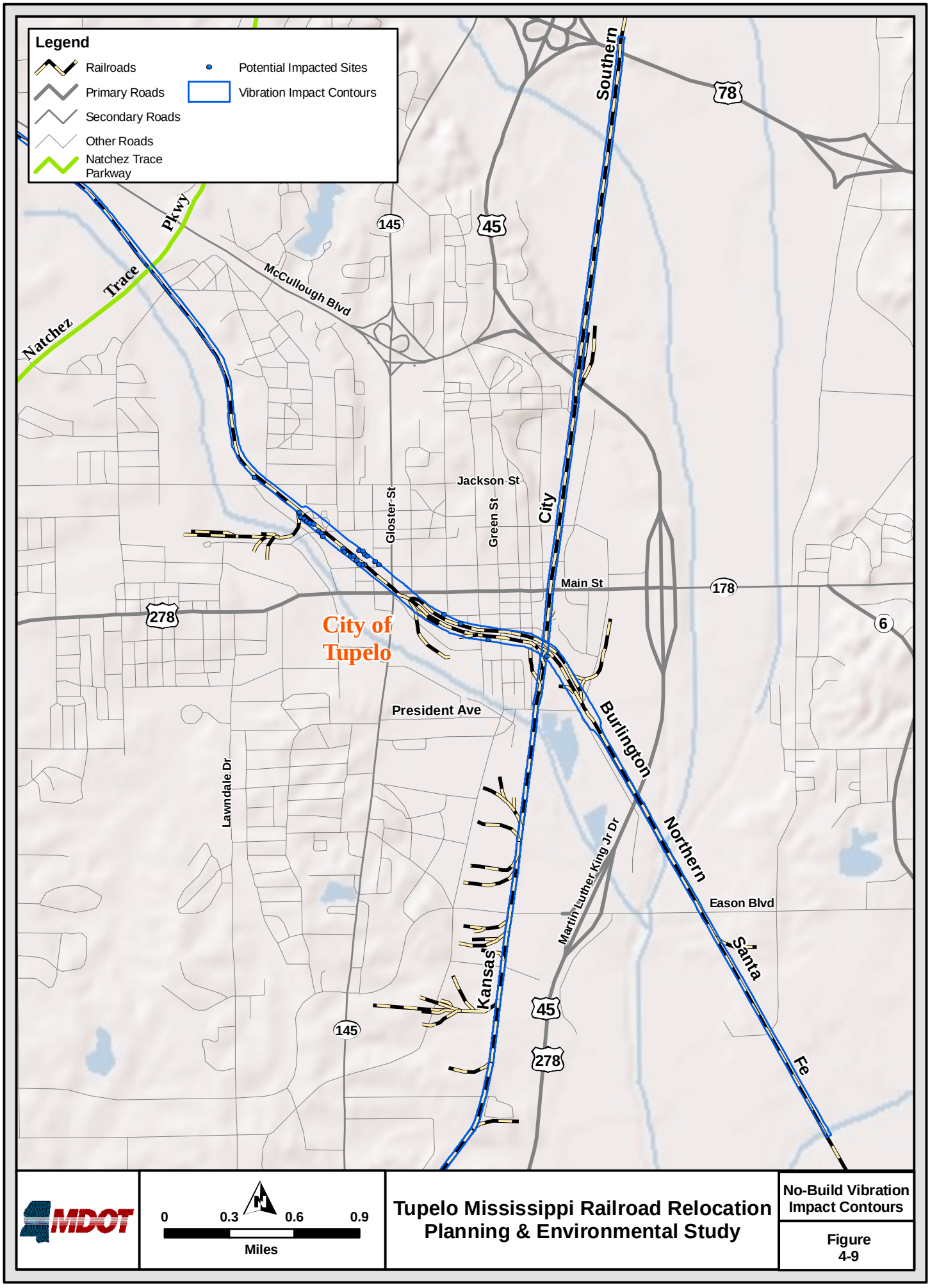
As documented in the NVA, included in **Appendix E**, these vibration impact contours were overlaid upon a digital aerial photograph of the project areas using GIS technologies. The number of residences inside the vibration contour was determined.

No-Build Alternative

Twenty-eight vibration-impacted sites were identified for the No-Build Alternative, shown on **Figure 4-9**. All of these sites are residential structures located in the downtown Tupelo area.

Build Alternative

Forty-six vibration-impacted sites were identified for the Build Alternative, shown on **Figure 4-10**. All of the sites are residential structures located in the downtown Tupelo area. Eighteen additional impacted sites are predicted as compared to the No-Build Alternative, due to the increase in the train speed from 20 mph to 40 mph. Because there is no predicted change in the make-up of trains between the No-Build and Build Alternatives, the increased operational speed for the Build Alternative is the primary cause of predicted increases in vibration impacts. Despite the increase in vibration, the predicted impacts are conservative and may not fully account for the increased path length from the elevated track to the impacted receptors. However, the anticipated increase in vibration associated with the Build Alternative would be still well below the potential damage threshold. Vibration mitigation options would require extensive design and could significantly increase construction costs, while providing only a minimal dampening of the vibration effects. These additional mitigation measures would not be cost-beneficial, since even the anticipated increase in vibration would remain well below the potential damage threshold.


Legend
Railroads
Primary Roads
Secondary Roads
Other Roads
Natchez Trace Parkway
Potential Impacted Sites
Vibration Impact Contours
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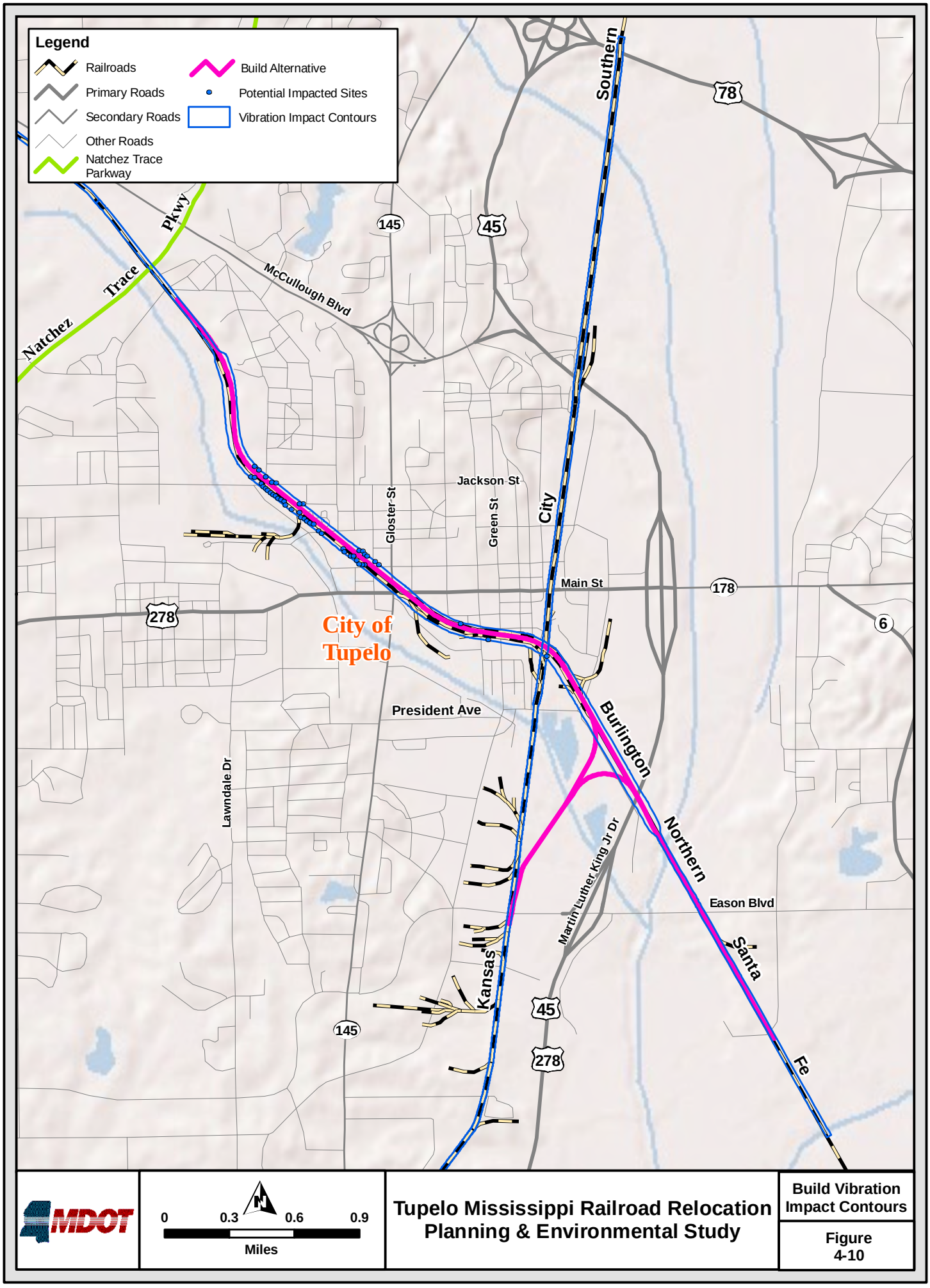
Tupelo Mississippi Railroad Relocation Planning & Environmental Study
No-Build Vibration Impact Contours
Figure 4-9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Railroads
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Other Roads
Natchez Trace Parkway
Build Alternative
Potential Impacted Sites
Vibration Impact Contours
Natchez Trace Pkwy
McCullough Blvd
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Tupelo Mississippi Railroad Relocation Planning & Environmental Study
Build Vibration Impact Contours
Figure 4-10

4.8 GEOLOGICAL RESOURCES

The No-Build Alternative and the Build Alternative were each investigated concerning the potential geotechnical problem sites along the BNSF main line and the proposed interchange. This investigation included potential settlement and stability problems along the BNSF main line and the proposed interchange for structures such as bridges and overpasses. Soil borings were recovered from the existing BNSF main line and from the proposed interchange area.

No-Build Alternative

There would be no impact to geological resources associated with the No-Build Alternative.

Build Alternative

The Build Alternative runs primarily along the existing BNSF main line. The majority of soil types along the existing alignment have low to moderate shrink-swell potential, which is indicative of a good ability of the native soils to support the elevated structures without special engineering. Areas located along the interchange area have somewhat higher shrink-swell potential, as Tuscumbia and Una soils are found in this area. However, the interchange area would be constructed at-grade, which is much more flexible than an elevated structure and would suffer less damage due to soil expansion and contraction.

4.9 WETLANDS

The No-Build and Build Alternatives run through agricultural, urban, or industrial portions of the City of Tupelo. These areas typically do not support high-quality wetlands or other water systems.

Considerable effort was made during the alternatives development process to avoid areas identified on the USFWS NWI maps. All wetland sites identified were generally less than an acre and classified as shrub-scrub. These wetlands were often found along electric power transmission or transportation rights-of-way. Although these areas may not be the highest quality wetland features, their function in the landscape serves to filter contaminants and dampen floodwaters.

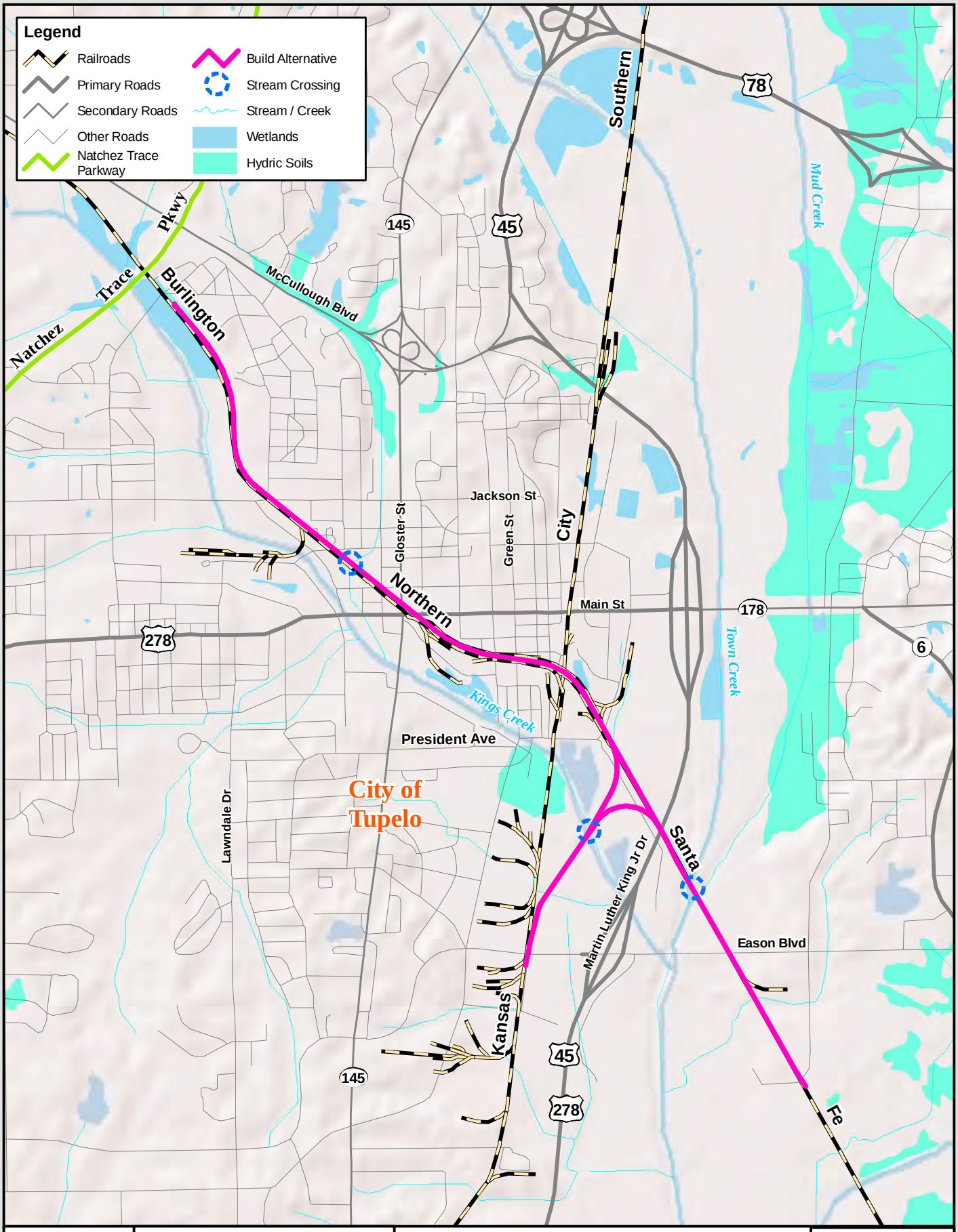
All wetland and stream impacts, as well as jurisdictional determination and mitigation assessments, should be considered preliminary for planning purposes and are subject to approval by the Mobile Regulatory Division and the Vicksburg Regulatory Division of the USACE.

No-Build Alternative

The No-Build Alternative would have no impact on wetlands and streams of the study area.

Build Alternative

One wetland area could be impacted by the Build Alternative, shown on **Figure 4-11**. A small wetland runs parallel to the existing BNSF main line southeast of the Natchez Trace Parkway crossing. The temporary rail used for the maintenance of rail traffic could encroach upon the wetland, but since the improvements are to be entirely within the BNSF right-of-way in this section, permanent impacts are not anticipated and the wetland would be restored


Legend
Railroads
Primary Roads
Secondary Roads
Other Roads
Natchez Trace Parkway
Build Alternative
Stream Crossing
Stream / Creek
Wetlands
Hydric Soils
Natchez Trace Pkwy
Burlington
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Tupelo Mississippi Railroad Relocation Planning & Environmental Study
Wetlands & Hydric Soils
Figure 4-11

when the temporary rail is removed. Proposed bridges on the BNSF main line would extend to the limits of the parallel existing bridges to minimize impacts to stream crossings. Because much of the Build Alternative would be bridged by the proposed structures or built outside of the designated wetlands, no mitigation would be required. A Section 404 permit would be required for any clearing that would need to take place inside a designated wetland.

Approximately 350 linear feet of stream impacts are anticipated with the Build Alternative. The existing BNSF main line already crosses most of the affected streams with existing bridge structures. The proposed bridges over the existing stream crossings would be wider than the existing bridges due to the need to accommodate a future second rail track. One new crossing of Kings Creek and two new crossings of intermittent streams would be part of the proposed interchange. However, the bridge work would require a Section 404 permit for the in-water work anticipated for bridge and pile construction.

4.10 FLOODPLAINS

As discussed in **Chapter 3**, flooding is the primary environmental concern around the City of Tupelo. Floodplains in Lee County generally follow the wide, mostly flat Blackland Prairie physiographic region, as these areas lie in valleys at the base of the Tombigbee Hills. Portions of the Build Alternative lie within the Town Creek, Mud Creek, and Kings Creek floodplains, shown on **Figure 4-12**.

There are many flood control measures located around the City of Tupelo in the Town Creek watershed. Many of the flood control measures in Lee County are managed by the TCMWMD. Any crossings of a regulatory floodway should be submitted to this organization for their review and given an opportunity for comment on final structures within their easements.

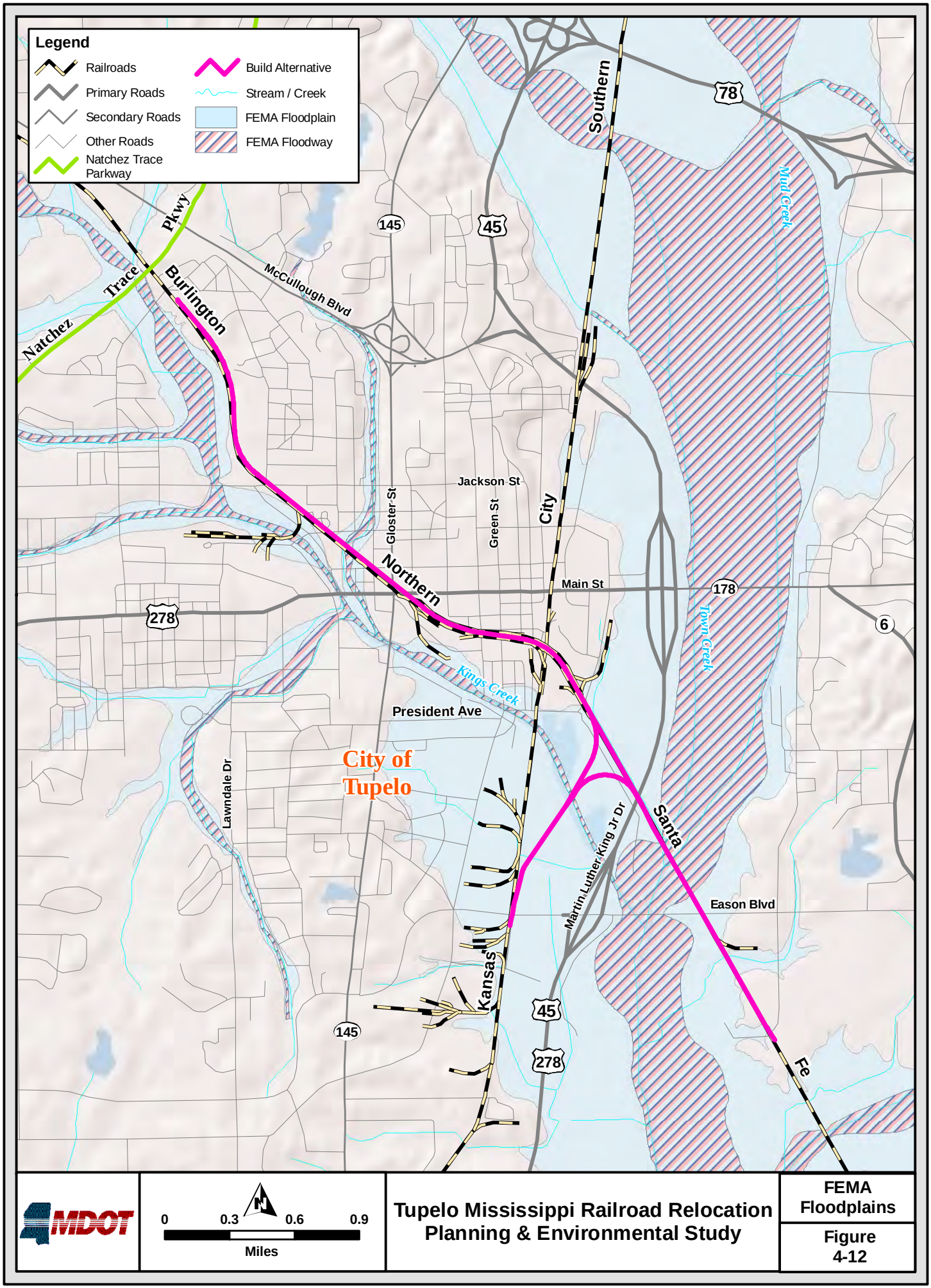
No-Build Alternative

The No-Build Alternative would have no impact to floodplains in Lee County, MS.

Build Alternative

The Build Alternative would be almost entirely placed on an elevated structure within the existing BNSF right-of-way. Little of the alignment would be placed at-grade, except for the proposed interchange.

The railway improvements of the Build Alternative cross three floodways and approximately 10 acres of 100-year floodplain. The Build Alternative crosses a regulatory floodway, designated as Kings Creek Tributary 1, in the heart of a residential section of Tupelo. This floodway is bridged by the existing BNSF main line. However, at no point does the Build Alternative run closely parallel or run along the flow line of a regulatory floodway or floodplain. The elevated railroad is on a bridge structure across this stream and would have no adverse impact to this floodway. In addition, the reduction in the number of bridge piers within the floodway and the increased low member elevation as a result of the elevated rail would enhance the floodway at this location.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Other Roads
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Build Alternative
Stream / Creek
FEMA Floodplain
FEMA Floodway
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Tupelo Mississippi Railroad Relocation Planning & Environmental Study
FEMA Floodplains
Figure 4-12

The Build Alternative crosses the regulatory floodway associated with the confluence of Mud Creek and Town Creek east of US 45. This floodway crossing is also bridged by the existing BNSF main line and is proposed to be bridged by the additional track proposed for the interchange yard associated with the BNSF Line. The Build Alternative also crosses the regulatory floodway associated with Kings Creek as part of the proposed interchange track. These bridge structures were designed to be above the base flood elevation to ensure that the conveyance of the Kings Creek, Mud Creek, and Town Creek floodwaters would not be impaired.

The proposed structures were designed to adequately span the existing floodways. Coordination with the TCMWMD to accommodate their planned floodway channel improvements would occur in the final design phase of this project.

4.11 HYDROLOGY AND WATER RESOURCES

4.11.1 Surface Waters

Surface water impacts can be viewed as either short-term construction or long-term operational impacts. Short-term construction related impacts can be reduced by careful implementation of the erosion and sediment control plan. Sediment contamination can lead to aquatic habitat degradation through loss of spawning areas, macro-invertebrate habitat loss, aquatic egg suffocation, gill irritation, lack of visibility for visual aquatic predators, and increased biological oxygen demand. Increases in suspended solids are also linked to increases in coliform bacteria, phosphorus, heavy metals, and organic chemicals.

Erosion at construction sites can be reduced by following through on an erosion and sediment control plan which usually encompasses a combination of efforts to prevent the loss of sediment from a site. MDOT is the largest administrator of construction projects in Mississippi and has had a Storm Water Pollution Prevention Plan (SWPPP) in place since October 1992. This plan was approved by MSDEQ and is routinely used successfully throughout the State on MDOT construction projects.

Long-term efforts to protect surface water can be made by managing stormwater as it leaves a project's right-of-way. Should contaminants build up on-site as a result of engine wear and tear, stormwater retention and detention ponds would allow the majority of these contaminants to settle out before runoff entered surface waters. Long-term stormwater impacts are less of an issue with rail projects than with highway projects. Normally right-of-way widths are less for railroads than for multilane highways, and that provides a greater amount of pervious surface area where rainwater can infiltrate into the soil instead of discharging directly into surface waters. This advantage is particularly true for the Build Alternative because much of the elevated viaduct will be on an elevated structure without an impervious surface below.

A number of federal, state, and local laws, and regulations, govern activities that could affect surface waters. Brief descriptions of these follow:

The Federal Clean Water Act (33 U.S.C. 1251 et seq) (CWA) is the primary federal law protecting the quality of the nation's surface waters. The Act prohibits any discharge of pollutants into the nation's waters unless authorized by a permit. Section 404 of the CWA establishes a permit program, administered by the USACE, to regulate the discharge of dredged or fill material into waters of the United States.

Section 402 of the CWA requires a National Pollutant Discharge Elimination System (NPDES) permit for discharges into waters of the United States.

Section 401 of the CWA requires that an applicant for a federal license or permit to allow activities that would result in a discharge to waters of the U. S. must obtain a state certification that the discharge complies with other provisions of the CWA. MSDEQ administers the certification program in Mississippi.

Section 303[d]of the CWA requires each state to provide a list of impaired waters that do not meet or are expected not to meet state water quality standards as defined by that section. It also requires the state to develop total maximum daily loads (TMDLs) from the pollution sources for such impaired water bodies. This has been done in the project area. The Town Creek Watershed evaluation indicated that the impairment is due to phosphorus and nitrogen from point and nonpoint sources. The estimated existing ecoregion concentrations indicate reductions of nitrogen and phosphorus can be accomplished with installation of best management practices and reductions to point sources in the watershed. The proposed project does not include activities that would normally increase levels of nitrogen and phosphorus in streams.

Section 14 of Rivers and Harbors Act (33 U.S.C. Section 408) requires permission for the use, including modifications or alterations, of any flood control facility work built by the U.S. to ensure that the usefulness of the federal facility is not impaired. The permission for occupation or use is to be granted by "appropriate real estate instrument in accordance with existing real estate regulations." For USACE facilities, the Section 408 approval, known as a Section 408 permit, is required.

There are many flood control measures located around the City of Tupelo in the Town Creek watershed. Many of the flood control measures in Lee County are conducted by the TCMWMD. Any crossings of a regulatory floodway would be submitted to this organization for their review and concurrence.

Executive Order 11988 (Floodplain Management) requires that federal agency construction, permitting, or funding of a project avoid incompatible floodplain development, be consistent with the standards and criteria of the National Flood Insurance Program (NFIP), and restore and preserve natural and beneficial floodplain values.

Under the federal CWA, discharge of stormwater from construction sites must comply with the conditions of an NPDES permit. The state has adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity that applies to projects resulting in 1 or more acres of soil disturbance. For projects disturbing more than 1 acre of soil, a SWPPP is required that specifies site management activities to be implemented during site development. These management activities include construction stormwater best management practices (BMPs), erosion and sedimentation controls, dewatering (nuisance water removal), runoff controls, and construction equipment maintenance.

In 1987, Congress amended the Clean Water Act (CWA) to require implementation, in two phases, of a comprehensive national program for addressing storm water discharges. The first phase of the program, commonly referred to as "Phase I" was promulgated on November 16, 1990, (55 FR 47990). Phase I in 40 CFR Parts 9, 122, 123, and 124 requires NPDES permits for storm water discharge from a large number of priority sources including municipal separate storm sewer systems generally serving populations of 100,000 or more and several categories of industrial activity, including construction sites that disturb five or more acres of land. In response to this requirement MDOT developed a SWPPP in October 1992, which was subsequently approved by the MSDEQ.

This document serves as the standard for controlling storm water runoff from MDOT construction sites that disturb more than 5 acres. The Stormwater Phase II Rule extends coverage of the NPDES stormwater program to certain "small" MS4s but takes a slightly different approach to how the stormwater management program is developed and implemented.

Bridges were used as much as possible in development of the Build Alternative. Where culverts are designed, they would be placed below grade to avoid scouring downstream from the structure.

No-Build Alternative

There would be no impacts to surface waters as a result of the No-Build Alternative.

Build Alternative

The Build Alternative lies within the City of Tupelo, where many streams are already impacted due to intense urban land use. A total of six perennial and ephemeral streams would be crossed by this alternative. Many stream crossings are currently traversed with a bridge or culvert structure for the existing rail line. Although the proposed BNSF main line parallels Kings Creek, it is located approximately 500 feet from the stream and well outside of the associated floodway.

The Build Alternative would affect approximately 350 linear feet of streams. The existing BNSF main line already crosses most of the affected streams with existing bridge structures. The proposed bridges over the existing stream crossings would be

wider than the existing bridges because of the need to accommodate a future second rail track. One new crossing of Kings Creek and two crossings of existing intermittent streams would be part of the proposed interchange. However, the bridge work would require a Section 404 permit for the in-water work anticipated for bridge and pile construction.

All stream crossings would be updated and modified during construction activities. This could result in, at most, short-term impacts associated with minor discharges of sediment. Because of the use of best management practices in design and construction; and, since the proposed project is largely within existing railroad right of way, long-term land use changes are not expected to occur. During construction activities, aquatic organisms are expected to undergo minor displacement resulting from construction activities, but these organisms are expected to return once activities cease. The overall land use will not change once construction activities are completed. Long-term effects to these streams are expected to be minimal.

The proposed interchange area would be the only area of new railroad right-of-way. Three small drainage ditches would require some channel alteration with the placement of pipes or culverts, and a new bridge would be placed over Kings Creek. BMPs for erosion and sediment control would be provided during construction and stream bank stabilization post construction. Coordination with the TCMWMD would occur during the design stage to ensure all structures placed within easements are acceptable.

Bridges were used as much as possible in development of the Build Alternative. Where culverts are used they would be designed with their floors below the normal stream bottoms. This will avoid scouring downstream from the structure and provide better aquatic habitat.

4.11.2 Designated Use

As discussed in **Section 3.11.2**, Mud Creek, Town Creek, and Kings Creek, are all on the MSDEQ 303(d) impaired water bodies list. Once on the list, MSDEQ is required to develop a plan to reduce the cause of impairment in order to restore the stream to healthy conditions. Part of the restoration plan is the development of TMDL, which is the maximum contaminant concentration in a water body that allows it to support the aquatic life designated use for each of these streams. TMDLs have been developed for Mud Creek, Town Creek, and Kings Creek for biological impairments.

No-Build Alternative

There will be no impacts to surface waters or to the MSDEQ restoration plans for Mud Creek, Town Creek, or Kings Creek associated with the No-Build Alternative.

Build Alternative

The primary surface water impact expected during the construction of the Build Alternative would be sedimentation, and increases in sedimentation can often be

linked to higher nutrient and pathogen levels. Once constructed, the Build Alternative would have very little impact on sedimentation, since it is a railroad mostly constructed on an elevated structure. The structure effluent would be treated within the BNSF right-of-way. Railroads typically do not contribute much to surface water or groundwater contamination. The Build Alternative would not hinder the MSDEQ restoration plans for Town Creek, Mud Creek, and Kings Creek.

4.11.3 Water Resources Management

The TCMWMD maintains each of the main channels around the City of Tupelo, including managing floodwaters, implementing channel improvements, applying land treatment measures, and it aids in debris removal around culverts and bridges. This organization holds conservation easements ranging from 250 feet to 550 feet along each of the main channels.

No-Build Alternative

There would be no impacts to any of the existing channels around the City of Tupelo with the No-Build Alternative. Therefore, there would be no need to consult the TCMWMD. The existing railroad bridges can accommodate the channel improvements proposed by the TCMWMD.

Build Alternative

The proposed improvements would construct one new bridge crossing of Kings Creek, three new culverts, and new bridges across Town Creek and Mud Creek. The Build Alternative would also require the permanent extension of two existing culverts and allow for the removal of one existing culvert. However, for the maintenance of rail traffic during the construction of the Build Alternative, 13 existing culverts would require extension and one new bridge across the Kings Creek Tributary No. 1 would be required. The TCMWMD would be consulted as to the additional channel improvements associated with the Build Alternative and its construction.

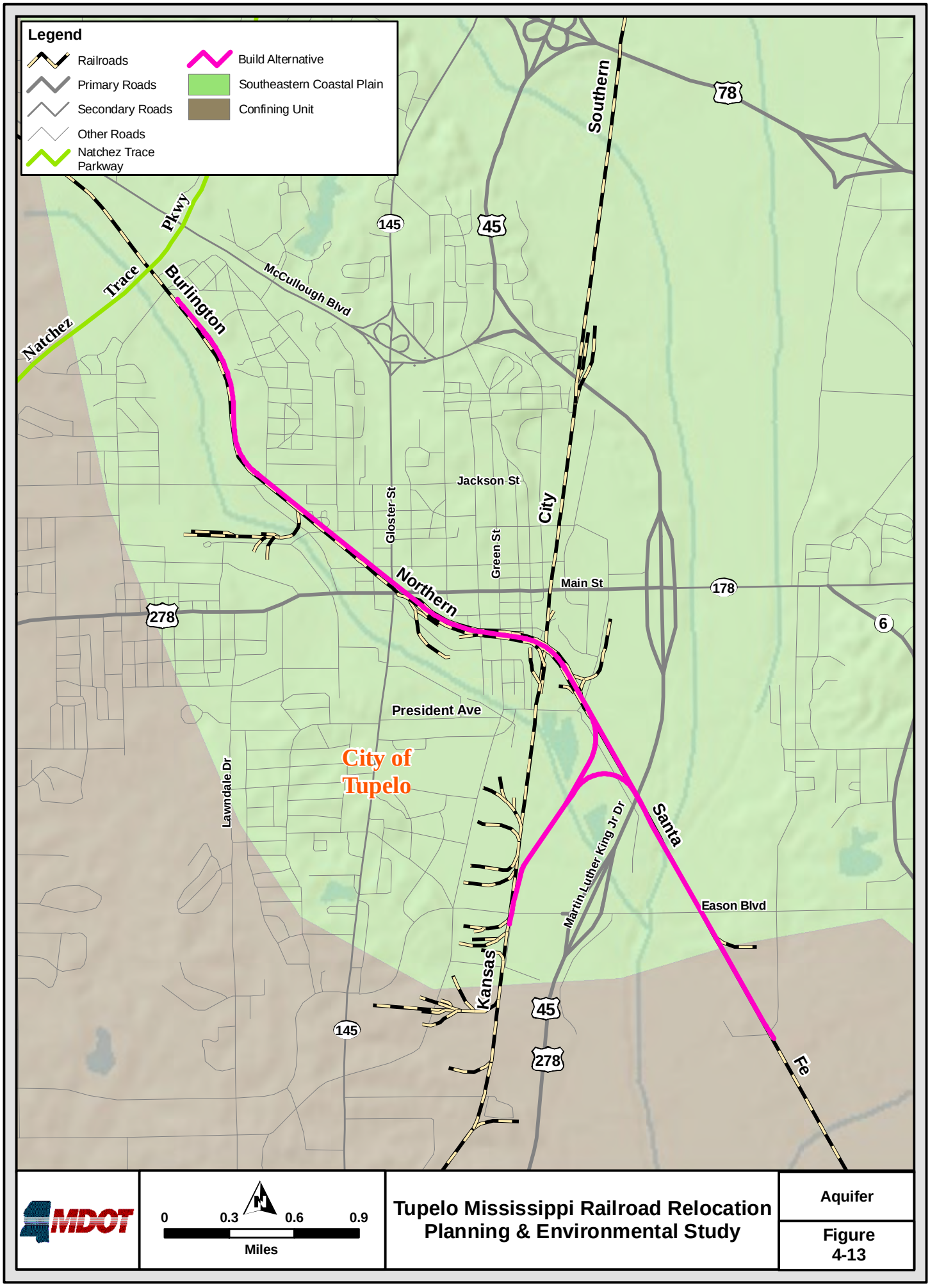
4.11.4 Wild and Scenic Rivers

There are no designated Wild and Scenic rivers within the study area. Therefore, there are no impacts to any Wild and Scenic Rivers under either the No-Build or Build Alternatives.

There are also no streams eligible for the Mississippi Statewide Scenic Stream Stewardship Program within the study area. Therefore, there are no impacts to any streams within this program associated with either the No-Build or Build Alternatives.

4.11.5 Groundwater

The City of Tupelo lies on the boundary of the Southeastern Coastal Plain Aquifer and a Confining Unit, shown on **Figure 4-13**. USGS measurements taken at wells near the BNSF main line show that the aquifer has a minimum depth of 230 feet below the ground surface. The City of Tupelo receives drinking water from the Tombigbee River, 18 miles northeast of Tupelo.


Legend
Railroads
Primary Roads
Secondary Roads
Other Roads
Natchez Trace Parkway
Build Alternative
Southeastern Coastal Plain
Confining Unit
Southern
78
145
45
Pkwy
Trace
Natchez
Burlington
McCullough Blvd
Jackson St
Gloster St
City
Green St
Main St
178
6
278
Northern
President Ave
City of Tupelo
Lawndale Dr
Martin Luther King Jr Dr
Santa
Eason Blvd
Kansas
Fe
0
0.3
0.6
0.9
Miles
Tupelo Mississippi Railroad Relocation Planning & Environmental Study
Aquifer
Figure 4-13

No-Build Alternative

There would be no impact to groundwater or drinking water as a result of the No-Build Alternative.

Build Alternative

Most of the proposed improvements, including all of the interchange area, are located over the Southeastern Coastal Plain Aquifer. Bridge piles are not anticipated to penetrate the aquifer. A small portion of the proposed storage yard along the BNSF main line would be over a Confining Unit, which prevents groundwater from percolating into an aquifer. With the aquifer insulated either by depth or by the Confining Unit, no impacts are expected to the Southeast Coastal Plain Aquifer. In addition, given the large distance between the Tombigbee River and the proposed improvements, no impacts are expected to the drinking water for the City of Tupelo.

4.12 FEDERALLY FUNDED AND PROTECTED PUBLIC FACILITIES

The inventory of land uses included a review of public parks, recreation areas, wildlife and waterfowl refuges of national, State, or local significance, or land of an historic site of national, State, or local significance.

4.12.1 Section 4(f) of the Department of Transportation Act Impacts

Section 4(f) of the Department of Transportation Act of 1966 (49 USC 303(c)), (Section 4(f)), declares that it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.

Section 4(f) specifies that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge, or site) only if:

1) there is no prudent and feasible alternative to using that land; and
2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

Section 4(f) further requires consultation with the U.S. Department of the Interior and, as appropriate, the involved offices of the USDA and the HUD in developing transportation projects and programs that use lands protected by Section 4(f).

This study evaluated over a dozen alternatives to determine if they satisfied the Purpose and Need of the project, were buildable, and whether they were socially, economically, and environmentally realistic solutions to the conflicts between rail and vehicular traffic in Tupelo. All the alternatives, except the Build Alternative, were

determined either to fail to satisfy the project's Purpose and Need or be infeasible and dismissed from further consideration.

One of the primary reasons that some of the dismissed alternatives were removed from consideration was that they would impact lands from resources protected by Section 4(f). Some of the alternatives would impact lands that could have archaeological or cultural significance to the Chickasaw Nation. Other alternatives would impact Chickasaw burial sites, and many alternatives would have impacts to the Natchez Trace Parkway. The exact location and severity of the impacts varied, but all of the dismissed bypass alternatives were expected to physically impact lands protected by Section 4(f).

The Build Alternative would be constructed largely on existing developed right-of-way without the use of any land or structures protected by Section 4(f). It would have no physical impact on any park, recreational facility, or wildlife refuge.

While the Build Alternative would not result in a physical use of a property protected by Section 4(f), this EIS also considered the visual effects the Build Alternative may have on the adjacent parks and the adjacent properties that are listed or eligible for the NRHP. To constitute a Section 4(f) impact, the visual effect would have to be of such magnitude that construction of the alternative would substantially impair the features or attributes that made the properties eligible for the NRHP or detract from the use of a public park.

Historic Resources

In coordination with the SHPO, the Build Alternative would have an adverse visual effect on 37 NRHP-listed or NRHP-eligible resources, including the NRHP-listed Mill Village Historic District, the NRHP-listed South Church Street Historic District, and three NRHP-eligible historic districts--the Gravlee, North Tupelo, and Joyner neighborhoods, as shown in **Table 4-6**.

The affected neighborhoods adjoin the railroad at ground level. The Build Alternative would elevate the railroad within the existing right-of-way so that it would no longer be a physical barrier to circulation and to eye-level sight lines within the City of Tupelo and within the historic neighborhoods. The SHPO has also expressed that any of the bypass alternatives would also have presented an adverse effect on the historic properties through the removal of the railroad tracks from their present location.

Adverse visual effects could result from a change in the viewshed of and from these parks and historic resources as the railroad would change from at-grade to an elevated viaduct. However, the elevated viaduct would not result in physical take of the properties and would result in several benefits to these resources. The elevated rail viaduct would result in less train noise, especially horn soundings, and would project exhaust fumes from the locomotives upward and away from the parks and historic

neighborhoods. In addition, access to the historic districts would be improved as the proposed project would remove barriers to pedestrian and traffic movements.

The majority of the historic resources potentially affected by the proposed project are eligible for the NRHP under Criterion C, which defines eligibility based on their architectural type, their period, method of construction, or because they are the work of a master architect, or because of their high artistic value. Some of the historic resources identified in the *Cultural Resources Investigations for the Tupelo Railroad Relocation Study* (Brockington, January 2009) are adjacent to the proposed improvements, while most are not within the direct line of sight. In either case, although the SHPO has determined adverse visual effects for these historic resources, the architectural features that make them eligible under Criterion C will not change with construction of the proposed improvements.

Other historic resources are eligible under Criteria A and C. Criterion A is defined as having association with historic events or broad patterns of history. The resources that are eligible under Criterion A may lose one facet of the many that made them eligible for their contributions to the industrialization of Tupelo: the at-grade railroad. However, there would still be a railroad at the same location, and all of the other factors that affected the historical development of Tupelo would remain unchanged.

Parks

Two adjacent city parks, Burt Park Liberty Gardens and Rob Leake City Park, shown on **Figure 4-5**, would also experience visual impacts from the elevated rail viaduct. Burt Park Liberty Gardens is located on the corner of Park Street and Jefferson Street and consists of a landscaped footpath among trees in an urban environment. The park has no recreational facilities and occupies less than one-tenth of an acre adjacent to the railroad, which can easily be seen from anywhere in the park, and is bounded by two at-grade rail crossings. The park serves as an urban garden. The elevated viaduct would not physically impact the park, and the proposed bridge structure would maintain the park's sight lines.

Rob Leake City Park is located along Joyner Avenue and lies on a ridge overlooking the adjacent existing BNSF main line. The park has several recreation facilities, including ball fields, tennis courts, and a public pool. The elevated structure would be constructed on fill with retaining wall, which would not physically impact the park. The viaduct would be on an incline adjacent to the park and the structure would not be visible from much of the park due to an existing vegetative barrier and the grade difference.

The viaduct would allow for trains to pass without horn soundings and create a "quiet zone" in central Tupelo, which would include these parks. The elevated viaduct could be viewed as an enhancement for the patrons of these facilities, where train noise, especially horn soundings, can be intrusive to the enjoyment of these facilities.

No-Build Alternative

No lands which would fall under protection by Section 4(f) would be used with the No-Build Alternative. Therefore, a Section 4(f) evaluation would not be required for the No-Build Alternative.

Build Alternative

There are no wildlife or waterfowl preserves within the affected environment. As determined through coordination with MDOT and the SHPO, there would be adverse visual impacts to two public parks, five NRHP-listed or NRHP-eligible historic districts, and 37 NRHP-listed or NRHP-eligible structures that lie within the project APE. However, the majority of those affected structures are not adjacent to the proposed improvements included in the Build Alternative and any visual impacts to the viewshed of or from those structures would not impair the qualities that made them eligible for listing on the NRHP. The parks, structures, and historic districts adjacent to the proposed improvements, shown in **Table 4-10**, would be more directly impacted and would be at the center of any mitigation efforts.

Table 4-10 Potential Section 4(f) Impacts

Resource	Facility Type	Build Alternative Impact	
		Type	Mitigation
Rob Leake City Park	Park	Visual - Retaining Wall	Vegetative Barrier / Context Sensitive Design
Burt Park Liberty Gardens	Park	Visual - Bridge	Multi-Use Path / Landscaping / Context Sensitive Design
Carnation Condensary	Indusrial	Visual - Bridge/Retaining Wall	Multi-Use Path / Landscaping / Context Sensitive Design
TVA 'Tupelo' Sign	Sign	Visual - Bridge	TBD
Joyner Historic District	Historic District	Visual - Bridge/Retaining Wall	Architectural Survey of District / Historic Signs / Context Sensitive Design
Gravlee Historic District	Historic District	Visual - Bridge	Architectural Survey of District / Historic Signs / Context Sensitive Design
North Tupelo Historic District	Historic District	Visual - Bridge	Architectural Survey of District / Historic Signs / Context Sensitive Design
South Church Street Historic District	Historic District	Visual - Bridge	Funding for Restoration Initiatives / Context Sensitive Design / Historic Signs
Mill Village Historic District	Historic District	Visual - Bridge	Funding for Restoration Initiatives / Context Sensitive Design / Historic Signs

The park functions of Burt Park Liberty Gardens and Rob Leake City Park would not be impaired by the Build Alternative. Both parks would remain intact as a result of the Build Alternative and both parks would experience a significant noise benefit from the construction of the elevated rail viaduct. Therefore, the Build Alternative would not involve a use of these parks.

The FRA, City of Tupelo, MDOT, and the SHPO are in the process of determining possible mitigation efforts, through a binding MOA, included in **Appendix F**, to

soften the appearance of the elevated rail viaduct and reduce the visual impacts to adjacent features. Potential mitigation could include context sensitive design, public art, and other visual treatments, as well as public involvement, restoration projects, and historic surveys. In addition, the elevated viaduct would introduce some benefits to these resources, such as reduced noise and the removal of stationary rail cars from the existing yard between Crosstown and Church Street.

The FRA in consultation with MDOT has concluded that the adverse visual effects on the historic resources resulting from the Build Alternative are not of such magnitude that they would substantially impair the features or attributes that give the properties their function or historic significance. Therefore, there are no Section 4(f) impacts as a result of the Build Alternative and a separate 4(f) Statement is not required.

4.12.2 Section 6(f)(3) of the Land and Water Conservation Fund Act Impacts

The Natchez Trace Parkway, Oren Dunn City Museum, and Ballard Park and Sportsplex have been LWCFA grant recipients within the City of Tupelo and thus fall under Section 6(f)(3) protection. However, only The Natchez Trace Parkway is within 500 feet of the existing BNSF main line.

No-Build Alternative

There would be no impacts to Section 6(f)(3) lands with the No-Build Alternative.

Build Alternative

The proposed improvements associated with the Build Alternative begin more than 1,000 feet south of the Natchez Trace Parkway overpass over the BNSF main line and are entirely within the existing BNSF right-of-way. No lands under the protection of Section 6(f)(3) would be impacted by the Build Alternative.

4.12.3 National Trails System Act Impacts

The Natchez Trace National Scenic Trail is protected under the National Trails System Act. One of the segments of the Natchez Trace National Scenic Trail is a six-mile foot path that parallels the Natchez Trace Parkway through the City of Tupelo. The trail crosses the BNSF rail line at-grade, approximately 150 feet north of the Natchez Trace Parkway overpass over the BNSF main line.

No-Build Alternative

There are no impacts to any facilities protected by the National Trails System Act associated with the No-Build Alternative.

Build Alternative

The Build Alternative improvements begin approximately 1,000 feet south of the Natchez Trace Parkway overpass over the BNSF main line. The Build Alternative would not affect either the Natchez Trace National Scenic Trail or its associated viewshed since the improvements will be entirely within the existing BNSF right-of-way and are on the opposite side of the Natchez Trace Parkway from the trail.

4.13 WILDLIFE

During construction activities, nearly all vegetative species would be removed and most animal species would flee from the area as clearing begins. Construction impacts to local fish and wildlife species are expected to be temporary, as construction areas are cleared of vegetation. However, the Tupelo area is a growing urban area, and most major impacts have already occurred or are occurring in response to growth in and around the City of Tupelo.

Where bridges are located, permanent effects are expected to be less than those associated with embankment style construction. However, an adverse shading effect can be expected under bridges. Where bridging or elevation occurs, areas below the elevated structure would no longer receive the same amount of sunlight as they would normally receive, resulting in reduced primary production. This shading effect on both terrestrial and aquatic species could result in further habitat degradation.

4.13.1 Vegetative Communities

As described in **Section 3.14.1**, a portion of the study area is located within the Blackland Prairie ecoregion, which is considered a critically endangered ecosystem, and is surrounded by rolling Tombigbee Hills which is part of the Southern Coastal Plain. However, there are no pristine prairie environments remaining in the Blackland Prairie in or around the City of Tupelo, and the affected environment generally contains either urban or agricultural areas.

No-Build Alternative

There would be no change to the Blackland Prairie ecoregion as a result of the No-Build Alternative.

Build Alternative

No areas of pristine Blackland Prairie exist and little forested area remains along the Build Alternative. While the majority of the Build Alternative lies within the Blackland Prairie area of Tupelo, the improvements would be almost entirely on previously developed land. The existing BNSF right-of-way has little vegetation and is cleared periodically as a routine component of track maintenance. Temporary habitat effects could possibly be significant during construction activities, and these would be mitigated through proper erosion and sediment control practices (BMPs). Construction of the railroad within the existing right-of-way would greatly reduce the potential adverse impacts to species.

The interchange area would cross Kings Creek with a bridge to avoid impacts to vegetative communities. The interchange area would also bisect agricultural fields between an industrial portion of Tupelo and US 45. The area is rapidly being converted to more industrial areas and cannot be considered prime habitat due to encroaching industry and human activity. Therefore, impacts to vegetative communities as a result of the Build Alternative are anticipated to be minimal.

4.13.2 Terrestrial Habitat

Because the primary land use for the study area is either agriculture or urban, most wildlife species expected in the study area are generalists and are able to survive in a wide range of habitats. Organisms found in open areas, including agriculture, are bobwhite quail, cottontail rabbit, red fox, mourning dove, and species of songbirds. Squirrels, white tail deer, wild turkey, woodcock, raccoon, ducks, geese, rails, and shore birds can be found in or near the study area. No environmentally sensitive habitat or species was found within the affected environment.

No-Build Alternative

The existing BNSF main line will remain at-grade with the No-Build Alternative, increasing the likelihood of train and wildlife collisions will increase as train traffic increases through Tupelo. There would be no other impacts to terrestrial species as a result of the No-Build Alternative.

Build Alternative

Because the Build Alternative is proposed primarily within the existing BNSF right-of-way, the potential adverse impacts to species are minimized. Impacts to species would be reduced in the areas where the rail line is elevated, resulting in less inhibited movement of species through the railroad right-of-way and reducing train and wildlife collisions. The likelihood of an increase in bird strikes by trains on the elevated viaduct is minimal, since the trains would only be travelling at 40 miles per hour and birds should be able to avoid vehicles travelling at that speed. Furthermore, the proposed construction of a green space bike path, as described in **Section 2.8.2.7**, could increase the amount of wildlife habitat within the City of Tupelo. Minimization of terrestrial habitat degradation would occur by reducing erosion and sedimentation at construction sites and quickly re-vegetating once construction is completed. After construction is finished, maintaining a vegetated buffer along the rail line would offer habitat within a highly industrial land use.

4.13.3 Aquatic Habitat

Organisms found in Kings Creek, Mud Creek, and Town Creek area are able to survive in a range of environmental conditions and are capable of living in poor water quality due to high sediment loads and stream channelization activities. Common fish species include bass, bluegill, and channel catfish.

No-Build Alternative

There would be no impacts to aquatic habitat with the No-Build Alternative.

Build Alternative

Due to existing urban land uses, relative distance to streams, use of bridge structures, and elevation of the rail line, effects to aquatic systems associated with the Build Alternative along this corridor are anticipated to be minimal. Minimization of aquatic habitat degradation would occur by reducing erosion and sedimentation at construction sites and quickly re-vegetating once construction is completed.

4.13.4 Threatened and Endangered Species

The only Federal or State listed endangered species within the affected area is the Price's potato bean. No critical habitats for any endangered species were found within the affected environment.

No-Build Alternative

The No-Build Alternative would not have impact on any sensitive organisms within the study area.

Build Alternative

There is little suitable habitat for the Price's potato bean along the Build Alternative as it runs through an intense urban area and primarily within the existing BNSF railroad right-of-way. No individuals were observed, and there is little potential for this species to exist due to the fact that corridors have already been significantly impacted. Remaining on the footprint of the existing rail line reduces the potential for major impacts to this species. No further coordination with USFWS would be required.

If a Price's potato bean population were found in the area of the Build Alternative during construction, bridging the area would not be considered a viable mitigation option. This species needs an open sunlight canopy to survive and the shading provided by bridge structures would be detrimental to the plant's survival. If the species were found along the project right-of-way, there could be potential to relocate individuals to The Nature Conservancy preserve in the Coonewah Creek watershed. Further coordination with the USFWS and The Nature Conservancy would be required if an individual were identified along the location during construction; however, this is not anticipated.

4.13.5 Conservation Easements

The TCMWMD maintains conservation easements surrounding several channels throughout the Tupelo area.

No-Build Alternative

There would be no impacts to any conservation easements with the No-Build Alternative.

Build Alternative

The Build Alternative includes four bridge structures to either replace existing bridges or to construct new spans across existing water bodies within the City of Tupelo. The new bridge structures include a bridge across Mud Creek and Town Creek for the proposed storage tracks along the BNSF main line and a bridge across Kings Creek for the interchange track. The existing BNSF main line bridge across a Kings Creek Tributary No.1 would be replaced with the proposed mainline elevated bridge structure and the existing Eason Boulevard bridge across Kings Creek and Town Creek would be replaced with the proposed bridge over the BNSF main line.

Coordination with the TCMWMD during design and construction of the bridges would occur to avoid conflicts with the conservation easements.

4.14 HAZARDOUS MATERIALS

Based on a review of database records, interviews with State and local officials who have knowledge of the study area, documents on file with the MSDEQ, and a site reconnaissance, no sites were identified with potential to significantly impact the railroad corridor, as detailed in **Section 3.16**. Impacts may be considered significant if the proposed improvement appears to affect buildings, underground tanks, or requires the purchase of adjacent property.

No-Build Alternative

Since there are no known sources of contamination within the existing corridor and no improvements are included in the No-Build Alternative, there would be no impacts to hazardous materials sites.

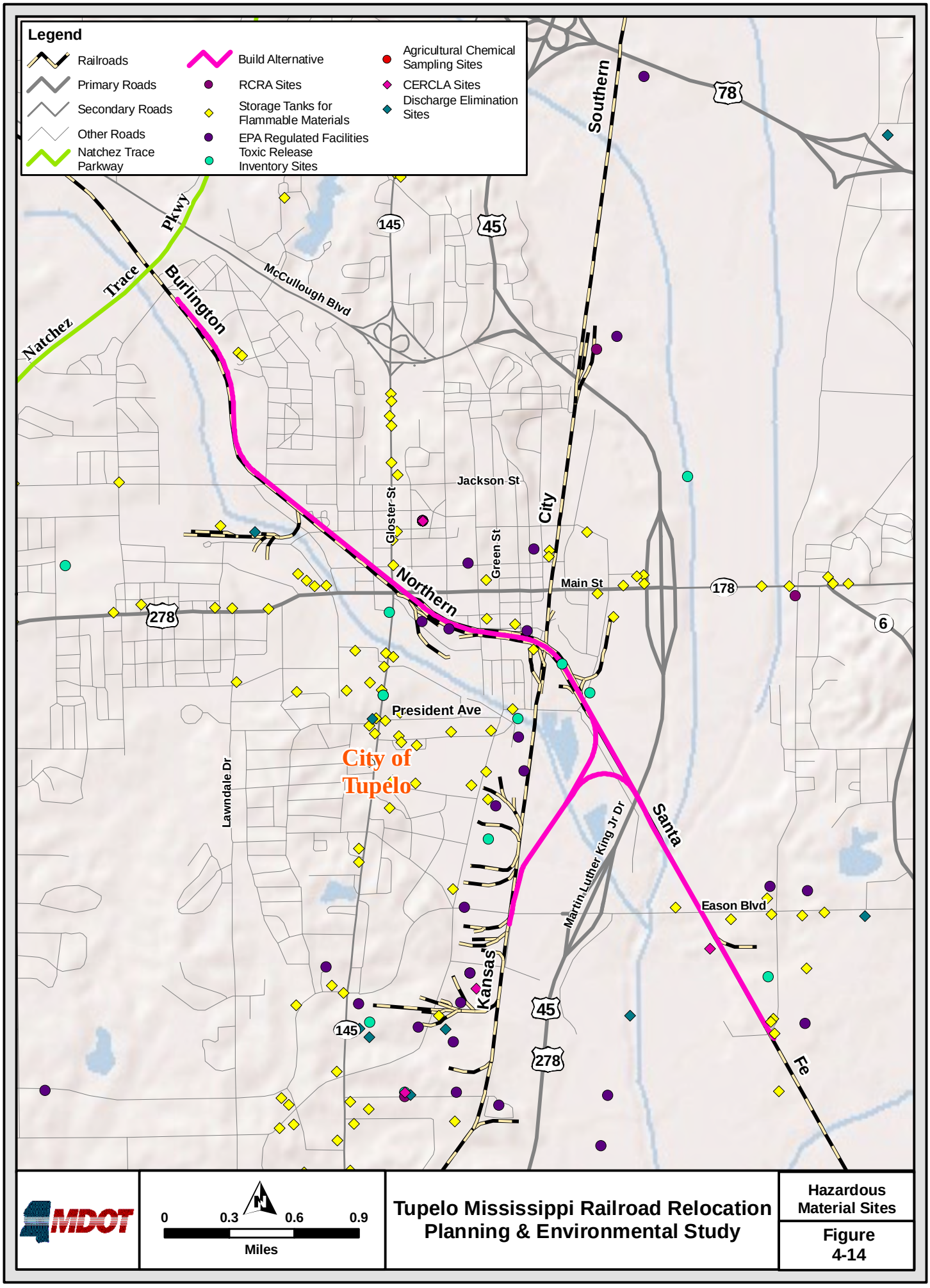
Build Alternative

Based on information obtained from reviews of available government records and maps, and a field reconnaissance of the railroad corridor and the adjacent areas, there is limited potential for hazardous materials impacts from the Build Alternative, shown on **Figure 4-14**. During this reconnaissance, no sites that warrant further investigation were identified. Some of the properties adjacent to the corridor have previously been the location of several industries, including manufacturing and textile mills. Therefore, care should be taken during construction activities to identify any evidence of contamination, such as discolored or stained soils or unusual odors. If evidence of contamination is noted during construction, environmental professionals and/or the MSDEQ would be notified.

4.15 AESTHETICS AND VISUAL RESOURCES

Visually sensitive sites were identified within the City of Tupelo and included known cultural resources, parks, and other recreation facilities in the immediate vicinity of the Build Alternative. A viewshed model was created for the length of the Build Alternative to determine the distance at which the elevated viaduct could be seen into each neighborhood, shown on **Figure 4-15**. Observer locations on top of the proposed bridge structure were established at nodes along the Build Alternative, and a 360-degree sweep of the landscape was performed at an observer height of six feet above ground. The visually sensitive sites identified within the viewshed of the proposed elevated viaduct were rated on the level of impact, shown in **Table 4-11**. Impact scores were determined by the following criteria:

- **Low** - Minor adverse change to the existing visual resource, with low viewer response to the change in visual environment. May or may not require mitigation.
- **Moderate** - Adverse change to the visual resource, with moderate viewer response. Aesthetic impact can be mitigated within five years, using conventional practices.
- **Moderately High** - Moderate adverse visual resource change with high viewer response, or high adverse visual resource change with moderate viewer response. Landscape treatment required will generally take longer than five years to mitigate.


Legend
Railroads
Primary Roads
Secondary Roads
Other Roads
Natchez Trace Parkway
Build Alternative
RCRA Sites
Storage Tanks for Flammable Materials
EPA Regulated Facilities
Toxic Release Inventory Sites
Agricultural Chemical Sampling Sites
CERCLA Sites
Discharge Elimination Sites
Southern
78
Pkwy
145
45
Trace
Burlington
McCullough Blvd
Natchez
Jackson St
Gloster St
City
Green St
Main St
178
Northern
278
6
President Ave
City of Tupelo
Lawndale Dr
Martin Luther King Jr Dr
Santa
Eason Blvd
Kansas
45
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0
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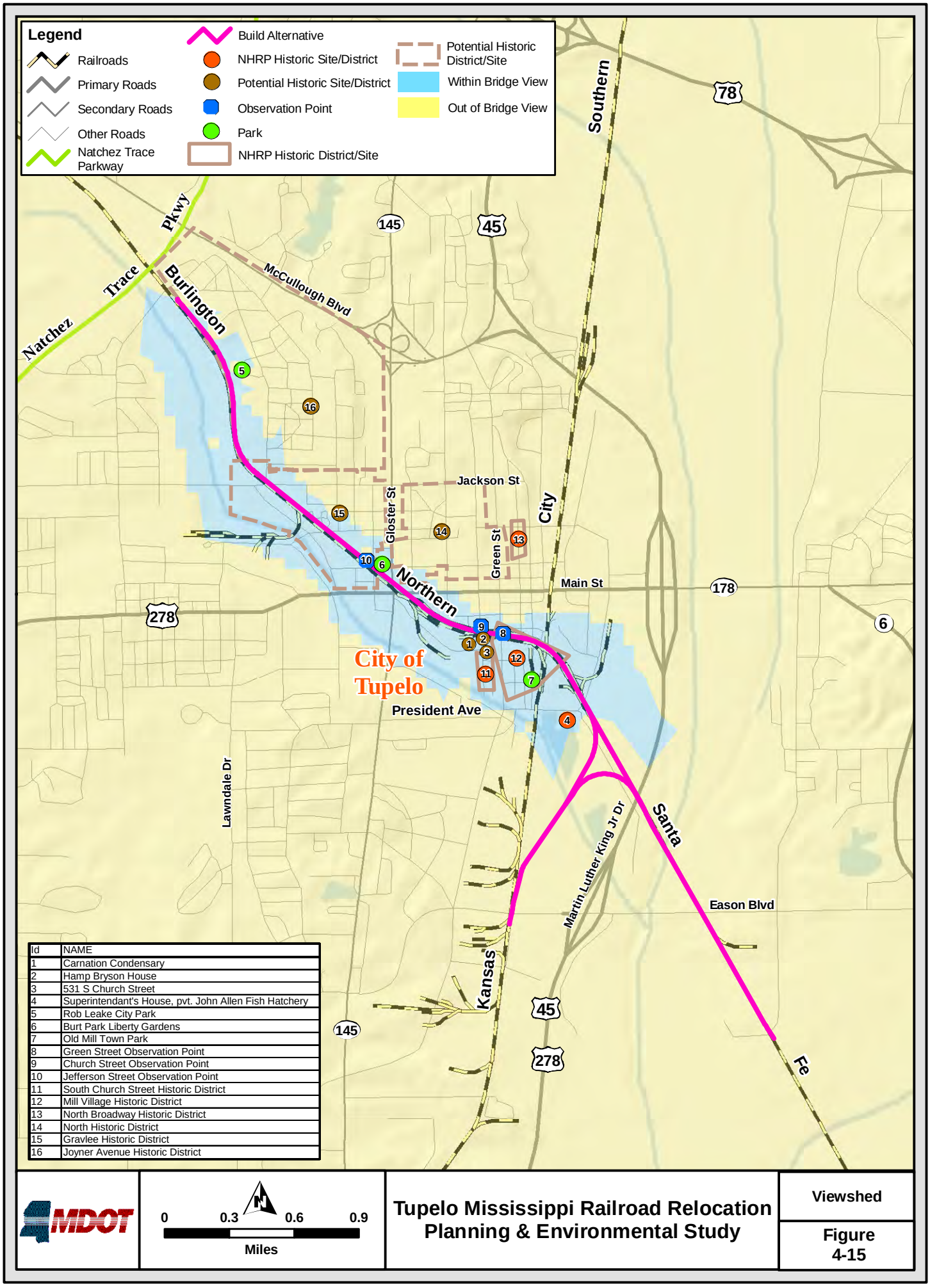
Miles
Tupelo Mississippi Railroad Relocation Planning & Environmental Study
Hazardous Material Sites
Figure 4-14



Id	NAME
1	Carnation Condensary
2	Hamp Bryson House
3	531 S Church Street
4	Superintendant's House, pvt. John Allen Fish Hatchery
5	Rob Leake City Park
6	Burt Park Liberty Gardens
7	Old Mill Town Park
8	Green Street Observation Point
9	Church Street Observation Point
10	Jefferson Street Observation Point
11	South Church Street Historic District
12	Mill Village Historic District
13	North Broadway Historic District
14	North Historic District
15	Gravlee Historic District
16	Joyner Avenue Historic District

- **High** - High level of adverse changes to the resource, or high level of viewer response to visual change, such that architectural design or landscape treatment cannot mitigate the impacts. An alternative project design may be required to avoid impacts.

Table 4-11 Aesthetic and Visual Impacts from Build Alternative

Visual Resource	NHRP Status	Visual Impact	Mitigation Option
Pvt. John Allen National Fish Hatchery	Listed	Low	None
Mill Village Historic District	Listed	**Moderately High**	Aesthetic design
South Church Street Historic District	Listed	**Moderately High**	Aesthetic design
Carnation Condensary	Eligible	**Moderately High**	Aesthetic design
Hamp Bryson House	Eligible	Moderate	Aesthetic design
531 S. Church Street	Eligible	Moderate	Aesthetic design
Joyner Historic District	Proposed	Low	None
Gravlee Historic District	Proposed	**High**	Elevated bridge w/ aesthetic design
Old Mill Town Park	N/A	Moderate	Aesthetic design
Burt Park Liberty Gardens	N/A	Moderate	Aesthetic design w/ pedestrian trail link
Rob Leake City Park	N/A	Moderate	Aesthetic design w/ vegetative barrier
TVA Sign at Crosstown Intersection	Proposed	**High**	Possible relocation or incorporation into bridge design

No-Build Alternative

The No-Build Alternative would not alter the viewsheds of any of the cultural resources, parks, and other recreational facilities within the City of Tupelo. The trains would still run through Tupelo at-grade and perform the interchange operations through the downtown Tupelo area. Trains would remain visible from the Old Mill Town Park and Burt Park Liberty Gardens, the NRHP-listed historic districts of Mill Village and South Church Street, and the NRHP-eligible structures and districts described in **Section 3.6.1**. Stationary rail cars would still be visible in the storage yard between Gloster Street and Church Street.

Build Alternative

The Build Alternative would replace an at-grade rail facility with an elevated rail facility within the existing railroad right-of-way. A large, permanent bridge structure approximately 25 to 30 feet high would cross through the heart of downtown Tupelo. The sentiment expressed by attendees at various project public meetings prevailed that the potentially

adverse aesthetic impact of a large bridge structure is offset substantially by the improvement of traffic flow issues associated with the current at-grade rail facility. However, while public opinion on the visual impacts is a significant factor in the design, visual impacts to historic structures, historic districts, and recreational facilities must also be evaluated.

Visual resources scoring High or Moderately High, identified in **Table 4-11**, would require some visual mitigation involved in the structure design, especially for NRHP-listed resources. Those highly affected resources are described with respect to their relative aesthetic impacts and mitigation recommendations, and photographic renderings of the Build Alternative were prepared for each resource to provide a visual benchmark as to the level of impact anticipated for each resource.

- **Mill Village Historic District** - *Moderately High* – This NRHP-listed historic district is bordered to the north by the BNSF main line. The existing heavy tree cover within the district will aid in masking the facility. However, the elevated rail viaduct would be visible from much of the historic district, especially looking along Spring Street and Green Street as well as from other breaks in tree cover. This district is listed on the NRHP for historic industrial structures. The bridge would be designed with context sensitive elements, to be determined during procedures outlined in the MOA included in **Appendix F**, which fits within the existing land uses.

- **South Church Street Historic District** - *Moderately High* - The BNSF railroad runs to the north of this NRHP-listed historic district. The proposed viaduct structure would be visible from much of the neighborhood. The South Church Street Historic District is NRHP listed for its historic homes. While the rail facility would not be residential in nature, the facility will be hidden by trees and other homes and buildings. Context sensitive design elements would lessen visual impacts to this historic neighborhood. The proposed pedestrian trail would add an opportunity for recreation and linkages to other recreational facilities within the City, enhancing the aesthetics of the district.

- **Carnation Condensary** - *Moderately High* - This is a closed factory building that borders the BNSF main line to the north and Church Street to the east. The factory itself is in a serious state of disrepair, but was purchased by the City of Tupelo with the intent of preserving its historic character. The existing viewshed regarding the BNSF main line includes the storage yard between Gloster Street and Church Street. The proposed viewshed would include the proposed fill structure with retaining wall, which could be considered a hindrance. However, because this viewshed is already compromised by stationary rail cars, the proposed fill structure with retaining wall in this area and the associated pedestrian trail could be considered an improvement.

Existing View Looking North from Mill Village Historic District (Spring St.)

View Looking North from Mill Village Historic District with Build Alternative

Existing View Looking North from Mill Village Historic District (Green St.)

View looking North from Mill Village Historic District with Build Alternative

Existing View Looking North within South Church Street Historic District

View Looking North within South Church Street Historic District with Build Alternative

Existing View Looking South into Church Street Historic District

View Looking South into Church Street Historic District with Build Alternative

Existing View Looking North Adjacent to Carnation Condensary

View Looking North Adjacent to Carnation Condensary with Build Alternative

Existing View Looking North at Crosstown Intersection

View Looking North at Crosstown Intersection with Build Alternative

Existing View Looking North within Gravlee District

View Looking North within Gravlee District with Build Alternative

Existing View Looking West from Rob Leake City Park

View Looking West from Rob Leake City Park with Build Alternative

- **Gravlee District** - *High* - This neighborhood has the highest potential for visual impacts as this district is bisected by the BNSF main line. A bridge structure would be critical for preserving cohesiveness within the district. An embankment style structure would be devastating to the continuity of the neighborhood, completely cutting off view from one side of the facility to the other. Because of the potential for major adverse visual impacts, this is the most important section of the project to receive a bridge structure rather than an embankment style structure. An aesthetic design is critical to preserve this historic neighborhood.

- **TVA Sign at Crosstown Intersection** - *High* - This sign was historically designed to be observed by visitors traveling towards the Crosstown intersection. While the setting of this resource has been dramatically altered in recent decades with the construction of modern commercial development, the sign has retained much of its historic value, including its colorful neon lighting. The Build Alternative would obstruct its view from visitors traveling on both Gloster Street and Main Street, and consultation with the SHPO would be coordinated to recommend possible mitigation measures. In addition, the construction of the truss bridge across Crosstown could require the temporary relocation of this sign, as it is located almost directly underneath the proposed structure. Mitigation options could include the relocation of this sign to another intersection within Tupelo along with the construction of a larger, more modern sign to be incorporated into the proposed truss bridge.

4.16 TRANSPORTATION AND UTILITIES

4.16.1 Highways

The effects on the highway network around the City of Tupelo can be measured in both capacity and travel delay. The impacts of the alternatives are likely to arise more from the construction process than as a permanent hindrance to the traffic flow.

No-Build Alternative

The highway network would experience greater vehicle delay with the No-Build Alternative as a result of the increased rail traffic across the at-grade intersections throughout Tupelo. Of particular concern would be the Crosstown intersection which is comprised of MS 145 (Gloster Street) and US 278/MS 6 (Main Street), which is also part of Appalachian Highway Corridor V. As discussed in **Section 4.4.7**, the traffic delay affects both the Crosstown intersection and adjacent intersections. Increased rail traffic would result in additional delays. Grade-separated highways, such as US 45 and US 78, would not experience the increased vehicle delay.

Build Alternative

Highways throughout Tupelo would be impacted by the Build Alternative, both by its construction and its final configuration. During the construction of the Build Alternative, the Crosstown intersection would require temporary lane closures to facilitate the construction of both the temporary track crossing and the proposed truss bridge structure across the intersection. These closures would occur during off-peak hours, and the intersection could remain open during peak traffic hours. Also, US 45 would be reduced to one lane in each direction as the overpass over the BNSF main line is reconstructed. All of the construction-related delays would be temporary.

The proposed Build Alternative would remove the majority of the at-grade railroad crossings within the City of Tupelo, especially those that experience the greatest amount of traffic. This would have a noticeable beneficial impact on the traffic flow in and around the Tupelo area, which would enhance the area's opportunity for future growth.

4.16.2 Airports

Tupelo provides regional air service at the Tupelo Regional Airport.

No-Build Alternative

There would be no impact to the Tupelo Regional Airport with the No-Build Alternative.

Build Alternative

The Tupelo Regional Airport is located more than one mile from the proposed improvements associated with the Build Alternative. Overall roadway traffic within Tupelo would see reduced delay with the Build Alternative, but none of the roads which access the airport would be impacted. Therefore, there would be no impact to the Tupelo Regional Airport associated with the Build Alternative.

4.16.3 Public Transportation

Greyhound operates long-distance passenger bus service with a station in Tupelo. Tupelo does not have local or regional bus service or passenger rail service. Therefore, there would be no impacts to public transportation with either the No-Build or Build Alternatives.

4.16.4 Pedestrian and Bicycle Facilities

Existing pedestrian and bicycle facilities are uncommon within the City of Tupelo.

No-Build Alternative

Pedestrian and bicycle facilities across the BNSF main line would remain unchanged with the No-Build Alternative. The sidewalk segments would remain disconnected across the railroad at Park Street and Church Street. In addition, future development for bicycle and pedestrian facilities would have to account for the at-grade railroad.

Build Alternative

The Build Alternative would greatly enhance pedestrian and bicycle facilities throughout Tupelo. The sidewalk segments at Park Street and Church Street would be connected across the BNSF right-of-way and a proposed pedestrian/bicycle trail would be constructed within the BNSF right-of-way from Lumpkin Avenue to Spring Street. In addition, sidewalk segments along all of the grade-separated crossings could be installed across the BNSF right-of-way. All such crossings would meet Americans with Disabilities Act (ADA) requirements.

The Build Alternative also includes a multi-use pedestrian/bicycle trail to be constructed within the outside 20 feet of the existing BNSF right-of-way once the elevated viaduct is complete and the temporary at-grade track has been removed. This trail would run from Jackson Street to Spring Street for a total length of approximately 1.5 miles. The trail would include a pedestrian crossing at Crosstown, which would require a pedestrian signal. Additional trail crossings at Blair Street, Jefferson Street, Park Street, Church Street, and Green Street would require stop signs

on the trail and appropriate signing and pavement markings on all cross-streets. The trail would also meet ADA requirements.

4.16.5 Utilities

The City of Tupelo includes many utilities, both subsurface and above-ground.

No-Build Alternative

There would be no impacts to utilities with the No-Build Alternative.

Build Alternative

The Build Alternative would impact several utilities within the City of Tupelo, shown in **Table 4-12**. These utilities were located based on a field reconnaissance performed in July 2008 and do not include all subsurface utilities. Potable water, sewer, and other underground utilities may exist within the existing BNSF right-of-way and the proposed interchange corridor, but they were not located with the surface evaluation of these corridors. In addition, overhead electric facilities may also carry telephone and cable television lines, but the specific carrier and utility owner information was not obtained for this study.

Table 4-12 Utilities Affected by the Build Alternative

Utility Type	Location	Relocation Needed	Utility Type	Location	Relocation Needed
Gas	Crossing BNSF R/W under Spring St. and KCS	Unknown	Overhead Electric (Distribution)	Along west edge of BNSF R/W between KCS and Elizabeth St.	N/A
Gas	Crossing BNSF R/W along north side of Eason Blvd	N/A	Overhead Electric (Distribution)	Crossing BNSF R/W along both sides of Elizabeth St.	Vertical
Gas	Crossing Eason Blvd west of US 45	N/A	Overhead Electric (Distribution)	Along south side of Eason Blvd. between Green St. and Veterans Blvd.	Horizontal
Overhead Electric (Distribution)	East edge of BNSF R/W along Shands Dr.	N/A	Overhead Electric (Distribution)	Crossing BNSF R/W south of Veterans Blvd.	N/A
Overhead Electric (Distribution)	Crossing BNSF R/W along south side of Jackson St.	Vertical	Overhead Electric (Distribution)	Along east edge of KCS R/W from south of Eason Blvd. to Main St.	Horizontal & Vertical
Overhead Electric (Distribution)	Along west edge of BNSF R/W between Jackson St. and Park St.	N/A	Overhead Electric (Distribution)	Along north side of Eason Blvd. between Green St. and US 45	Horizontal
Overhead Electric (Distribution)	East edge of BNSF R/W from north of King St. to Gloster St.	Horizontal	Overhead Electric (Transmission)	Crossing BNSF R/W 700' south of Elizabeth St.	Vertical
Overhead Electric (Distribution)	Crossing BNSF R/W south of Main St.	Vertical	Overhead Electric (Transmission)	Crossing BNSF R/W 1200' north of US 45	Vertical
Overhead Electric (Distribution)	Along south edge of BNSF R/W from south of Main St. to Church St.	N/A	Overhead Electric (Transmission)	Crossing BNSF R/W 750' north of US 45	Vertical
Overhead Electric (Distribution)	Crossing BNSF R/W along east side of Church St.	Vertical	Sanitary Sewer	East edge of BNSF R/W along Shands Dr.	N/A
Overhead Electric (Distribution)	Crossing BNSF R/W along east side of Green St.	Vertical	Sanitary Sewer	Manhole within BNSF R/W south of Elizabeth St.	Horizontal
Overhead Electric (Distribution)	Crossing BNSF R/W along east side of Spring St.	Vertical	Sanitary Sewer	Manholes (2) in field south of Pvt. John Allen Fish Hatchery	Horizontal

Horizontal relocations would include the repositioning of utility poles or the re-routing of an underground facility. Vertical relocations would include the transposition of an overhead line either to a taller utility pole or to an underground facility. The cost of these utility relocations would be the responsibility of the utility owner. Utility owners have been contacted and coordination with utility owners to

estimate relocation costs and further identify utilities within the project corridor is ongoing.

4.17 ENERGY IMPACTS

Energy generation and consumption data specific to Tupelo and Lee County were not available, thus energy data for the State of Mississippi was obtained from the U.S. Energy Information Administration.

Existing (2005) and future (2030) fuel consumption was calculated for the No-Build and Build Alternatives based on the VISSIM traffic modeling, described in **Section 4.5.7**, for the PM peak period and expressed in vehicle miles traveled (VMT). The VMT statistics represent the system-wide traffic projection and generally indicates the overall volume of traffic circulating under each alternative. Vehicle hours traveled (VHT) were summed for all the traffic in the model network to represent PM peak fuel consumption under each alternative. The hours traveled is indicative of the hours of fuel consumption for each alternative during the PM peak hours. This analysis does not estimate fuel consumed during off-peak hours or changes in technology that would lead to reduction of fuel consumption. Operational average daily peak miles, trips, and hours traveled by trains and vehicles for the No-Build and Build Alternatives are summarized in **Table 4-13**.

Table 4-13 Average Daily Vehicle Miles and Hours During PM Peak Hours

Parameter	2005 (Existing)	2030 No-Build Alternative	2030 Build Alternative
Vehicle Miles Traveled	5,383	7,062	7,254
Percent Change	-	31%	35%
Total Vehicle Trips	11,253	14,928	15,283
Percent Change	-	33%	36%
Vehicle Hours Traveled	326	829	519
Percent Change	-	154%	59%

Source: Production and Consumption of Energy Technical Memorandum (ABMB, 2008)

No-Build Alternative

The No-Build Alternative would require minimal construction energy. Any energy expended would be for periodic rail and roadway maintenance, which would occur over time until the condition of either the rail or roadway network significantly deteriorates and warrants complete reconstruction. As shown in **Table 4-13**, the No-Build Alternative would result in 154% more VHT as compared to the existing conditions, even though the traffic volumes are anticipated to increase by approximately one-third. This is representative of nearly a three-fold increase in fuel consumption as a result of automobile delay due to the No-Build Alternative.

Build Alternative

The Build Alternative would decrease the overall amount of energy consumed compared to the No-Build Alternative, as shown in **Table 4-13**. The VHT associated with the Build Alternative would increase by approximately 59% as compared to the existing condition, or by approximately one-third of the VHT increase associated with the No-Build Alternative. This decrease in VHT is inclusive of the relative increase in VMT and total vehicle trips as compared to the No-Build Alternative. The primary direct impacts on transportation energy use related to the Build Alternative would result from changes in traffic volumes and traffic patterns. Removing at-grade crossings reduces the fuel consumption per automobile because of the unrestricted flow of traffic and fewer delays while traveling. The operational energy required is anticipated to be less because of reduced vehicular congestion and increased safety near the elevated railroad.

The Build Alternative would have a net beneficial impact on energy expenditures of the BNSF freight rail line because it would separate train traffic from the existing at-grade crossings, reducing train delays. Energy consumption would be reduced because the newer, elevated rail tracks offer higher travel speed and decrease delays. The interchange between the KCS and the BNSF would increase the efficiency of the exchange and reduce energy consumption. Over the design life of the facility, the savings in operational energy would be anticipated to offset the energy required to construct the viaduct.

The use of energy for the construction of the Build Alternative would be a short-term impact on energy resources, representing only a minor age of the total energy consumed throughout the study area during the construction period. It is not anticipated to result in adverse impacts on the overall demand for energy during construction.

4.18 CONSTRUCTION IMPACTS

The construction activities associated with building the elevated viaduct and associated roadway improvements would create environmental impacts. These impacts are generally short-term in nature and would be controlled, minimized, or mitigated through conformance with established construction methods. Temporary impacts resulting from construction include traffic disruption, increases in noise pollution, increases in vibration, decreases in air quality, erosion, sedimentation, and encroachment on sensitive animal and vegetative habitat.

Construction activities would be performed to comply with applicable Federal, State, and local laws governing safety, health, and sanitation. These activities would include safeguards, safety devices, protective equipment, and any other needed action reasonably necessary to protect the life and health of employees on the job, the safety of the public, and property in connection with the performance of the work.

Traffic

During construction, all local and through traffic would be adequately and safely accommodated. All construction operations would be scheduled to minimize traffic delays, and the contractor will conform to standard construction practices. The plan for maintenance of traffic for each phase of construction of the Build Alternative would be developed during

the final design of the project and would include temporary lane or road closures and appropriate detours. A community relations/construction mitigation program would be developed and implemented in order to provide general construction scheduling information, coordination of construction work with local jurisdictions, and assistance with the resolution of problems concerning adjacent land uses associated with the construction work.

Noise and Vibration

Noise generated by haul trucks and other heavy equipment used in railroad, roadway, and bridge construction and paving is anticipated. The range of construction noise depends on the noise characteristics of the equipment and activities involved (e.g. pile driving), the construction schedule (time of day and duration of activity), and the distance from sensitive receptors. Expected phases of construction include land clearing and excavation, demolition, utility relocation, drainage construction, and bridge construction. Noise impacts, including pile driving and vibratory compaction of embankments, would be temporary and control measures would be implemented to reduce the impacts.

Water Quality

During project construction, potential short-term increases in water turbidity, which could affect wetlands and water quality, would vary from none to moderate. Qualitative short-term construction impacts to water quality, listed below, would not be permanent and would be minimized by using BMPs, consistent with State and local standards.

- Chemical Pollutants – Minor
- Biota – Minor
- Turbidity – Moderate
- Sedimentation – Minor

Direct effects on water quality during construction may include spills or discharges. However, BMPs and proper planning should prevent such occurrences.

Water quality degradation as a result of stormwater runoff is expected to be minimal as stormwater management rules and regulations are strict, and compensation for this type of impact would be provided. Adverse impacts on water quality during construction can be successfully mitigated through a variety of good construction and stormwater management practices. Water quality impacts resulting from erosion and sedimentation would be controlled in accordance with standard construction practices and through the use of BMPs.

Air Quality

Air quality impacts would be temporary and would primarily be in the form of exhaust emissions from trucks and construction equipment as well as from fugitive dust from construction sites. Almost all of the trucks and other equipment involved in construction activities would be diesel-powered. Overall, construction vehicle emissions would not be significant compared with the emissions from automobile traffic in the area. Detours and other delays in traffic during construction typically result in local increases in vehicle emissions. These impacts would be minimized by adherence to State and local regulations and in accordance with standard construction practices.

Construction Waste

All construction waste material generated during clearing, grubbing, and other construction phases would be removed from the project site and disposed of by the contractor in accordance with State and local regulations. Litter and other general trash would be collected and disposed of at landfill locations. Construction waste deposition in and borrow from jurisdictional wetlands would not be allowed unless permitted by the USACE.

Utility Service

Construction of the Build Alternative would require some adjustment, relocation, or modification to existing public utilities. The impacts to these utilities are described in **Section 4.16.5**. Any disruptions to utility service during construction would be minimized by phased adjustments to the utility lines. All modifications, adjustments, or relocations would be coordinated with the affected utility owners.

Borrow Pits and Spoil Sites

Approved borrow material would be taken from sites in conformance with Federal, State, and local regulations. MDOT has worked closely with USFWS, SHPO, and other regulatory agencies to develop better procedures for evaluating and selecting borrow pits and spoil sites. All required permits (e.g. utility protection and erosion control) would be obtained before gathering the borrow material and the pit sites are determined satisfactory from an archaeological standpoint. Tribal governments would be consulted where necessary.

Any material excavated would be disposed of in accordance with Federal, State, and local regulations. Excavated materials would not be disposed of in wetlands. After the completion of pit operations, water would not be allowed to pond.

4.19 INDIRECT AND CUMULATIVE IMPACTS

4.19.1 Indirect Impacts

Indirect effects are defined by the Council on Environmental Quality (CEQ) as:

> "*...caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems"* (40 CFR §1508.8).

In many cases, these indirect effects would occur outside of a specific project area. As to the cause and effect relationship between the project and the indirect impact, CEQ states that indirect effects may include induced changes to land use resulting in resource impacts (40 CFR §1508.8). Other indirect effects include the potential alteration of or encroachment on the affected environment. Examples of this include fragmentation of a habitat and functional effects to water resources.

This analysis follows guidance from the National Cooperative Highway Research Program (NCHRP) Report 466, *Desk Reference for Estimating Indirect Effects of*

Proposed Transportation Projects, from the Transportation Research Board and NCHRP Report 25-25, Task 22, *Land Use Forecasting for Indirect Impacts Analysis*.

NCHRP Report 466 identifies three general categories of indirect land use effects:

- Those stemming from projects planned to serve a particular land development project;
- Projects likely to produce complementary land development (highway-oriented businesses); and
- Projects likely to influence intraregional location decisions.

Although the Build Alternative (elevation of an existing rail line) is not anticipated to induce development adjacent to the corridor, it would result in improved efficiency for the transportation network within the City of Tupelo. As a result, it could provide enhanced opportunities for development elsewhere in the City. The City of Tupelo and other local planners in the surrounding areas agree that a more efficient transportation network could enhance development opportunities. However, it is not possible to precisely quantify development that would occur as a result of the enhanced opportunities. Because the amount of development associated with the proposed project cannot be quantified, the following resource sections contain a qualitative assessment of the indirect effects that could occur as a result of enhanced development opportunities. Because the Build Alternative would remove the majority of the at-grade crossings within the City of Tupelo, the affected environment for the indirect effects analysis is bounded by the city limits. However, based on input from the City of Tupelo, it is anticipated that the majority of the enhanced development opportunities would be concentrated in downtown Tupelo.

4.19.1.1 Land Use

Tupelo: The Story Continues - The 2025 Comprehensive Plan (December 2008) was adopted by the City of Tupelo to outline the City's and region's growth and development plan for the next two decades. The plan is updated every five years and directs inter-agency coordination and molds policy. Some of the main goals of the comprehensive plan include revitalizing neighborhoods, expanding economic development, and improving transportation. The comprehensive plan identified the relocation of the BNSF railroad crossing at the Crosstown intersection as an immediate need to enhance transportation safety within Tupelo. The development of a network of greenways, bikeways, and sidewalks was also identified in the comprehensive plan as a long-term goal.

The majority of the proposed project would occur in a developed area. Existing land uses within ½-mile of the Build Alternative include residential, commercial, industrial, and agricultural. The City of Tupelo and the surrounding area are experiencing rapid growth and as a result, agricultural areas both within and outside of the city limits are being converted into

housing and business developments. This on-going trend of conversion from agricultural or undeveloped lands to residential and commercial areas is likely to continue with or without the proposed project. To the extent that the rate of development is increased by the proposed project, indirect effects could occur. Development is anticipated to be consistent with the comprehensive plan and zoning regulations, and, as a result, the change from undeveloped to developed uses is not anticipated to be significant.

4.19.1.2 Farmlands

Although some of the land that would be converted to developed uses is currently in agricultural use, the NRCS has stated that farmland within the city limits is considered to be in "urban" use. As a result, any conversion of agricultural land to developed uses would not be considered an adverse effect.

4.19.1.3 Socioeconomic Conditions

Indirect economic impacts include the impact on the local and regional economy due to enhanced development opportunities. These impacts are generally beneficial, such as increased tax revenue from developed land, increased household income and employment opportunities from new commercial development, reduced costs due to reduction in travel times and congestion, and increased income from construction of new development. Adverse economic impacts may occur during construction as traffic may be diverted around Tupelo. However, long-term employment opportunities could be increased as the growth following improvements in rail and roadway transportation. Population growth could follow employment growth and could increase additional demand for housing, and services. The Build Alternative would allow local traffic better access to residential, commercial, and industrial services within central Tupelo.

4.19.1.4 Environmental Justice

The on-going trend of conversion from agricultural or undeveloped lands to residential and commercial areas is likely to continue with or without the proposed project. Although there are minority and low-income populations within the City, the enhanced development opportunities afforded by the proposed project is not anticipated to result in disproportionate adverse effects to these vulnerable populations because those impacts will be felt by all populations.

4.19.1.5 Public Facilities and Community Cohesion

Any enhanced development opportunities would be anticipated with the City of Tupelo's comprehensive plan and zoning regulations and would not result in adverse effects to public facilities. The Build Alternative would not separate any neighborhoods as the alignment primarily follows the existing railroad. Because the affected environment is moderately developed, it is unlikely that additional development, regardless of whether or not is it

enhanced by the proposed project, would result in adverse effects to community cohesion.

4.19.1.6 Cultural Resources

Archeological sites are typically directly affected through site clearing, grading, or excavation during development. Due to the history of the Tupelo area regarding the Chickasaw Nation, many archeological resources in the affected environment are unknown. Determination of whether any of the development forecasted by local planners would result in adverse effects to these sites cannot be made because the quantity, location, and character of individual resources are unknown.

Indirect effects, as defined by Section 106 of the National Historic Preservation Act, would occur where the integrity of the resources would be affected by a change in viewshed. The MOA, discussed in **Section 4.5.1** and included in **Appendix F**, is anticipated to account and mitigate for the direct effects and in so doing, will also mitigate for any indirect effects. Although it is possible that other archaeological sites exist in the affected environment, it is not possible to determine potential effects, as the exact location and nature of the resources are unknown and areas for potentially enhanced development cannot be quantified.

Some development may fall under Federal or State regulatory resource protection review, and therefore, archeological and historic resources could be protected, preserved, or mitigated. If development is publicly funded, or if private development requires certain Federal permits, such as a permit under Section 404 of the CWA, then it would likely be subject to Federal or State regulations. However, most of the development, such as residential and commercial development, would not fall under the regulatory review process; therefore, these resources would have no protection under Federal or State laws.

4.19.1.7 Air Quality

Any future development may cause degradation of air quality as a result of increased traffic volumes within the affected environment. However, based on the comprehensive plan and zoning, most of the development would be residential and commercial.

Potential indirect effects to air quality are not considered to be significant, and air quality may improve over time. Overall emissions would likely decrease due to the rapidly improving fuel and vehicle technology and vehicle turnover in the future years. Improved traffic flow in areas of existing congestion would also result in improved air quality.

4.19.1.8 Noise and Vibration

Increases in vibration are not anticipated with any potential development that would be enhanced by the proposed project. Additional noise could result from future development. To the extent that this development is induced by the proposed project, an indirect effect of increased noise levels could occur. Noise is essentially a localized physical condition, with most of the noise from any increased development resulting from increased traffic within the study area. The proposed project is only anticipated to enhance the rate of development, rather than induce additional development within the study area. As a result, potential indirect effects to noise levels are not anticipated to be significant.

4.19.1.9 Geological Resources

The development in the study area is anticipated to be primarily residential and commercial. Any development, regardless of whether it is accelerated by the proposed project, would be anticipated to conform to current building codes and would not be in conflict with geological resources.

4.19.1.10 Wetlands

The proposed project is only anticipated to enhance opportunities for development rather than induce additional development beyond what is already planned. Regardless of whether development is public or private, it would be subjection to Sections 404 and 401 of the CWA, which regulates impacts to waters of the U.S., including wetlands. As a result, significant indirect effects to wetlands are not anticipated.

4.19.1.11 Floodplains

In general, floodplains pose a constraint to development regardless of whether it is accelerated by the proposed project. This constraint relates to the regulation of these floodplains through county and local ordinances. While these ordinances do not prohibit development within the floodplain, they limit and regulate development to eliminate or reduce potential damage from future floods. Development within floodways is prohibited. Any enhanced development opportunities would be subject to the local ordinances governing development within floodplains. As a result, significant indirect effects to floodplains are not anticipated.

4.19.1.12 Hydrology and Water Resources

Development effects that contribute to degradation of surface waters include increased impermeable surface and increased non-point source pollution (e.g. from fertilizers, pesticides, sediments, and vehicle residues). However, the proposed project is only anticipated to accelerate the rate of development, rather than induce additional development within the affected environment. Any development would have to comply with MSDEQ requirements, which will help minimize impacts to water quality.

4.19.1.13 Federally Funded and Protected Public Facilities

Any enhanced development opportunities would be anticipated with the City of Tupelo's comprehensive plan and zoning regulations and would not result in adverse effects to Federally funded and protected public facilities.

4.19.1.14 Wildlife

The majority of the undeveloped and agricultural lands within the City are interspersed within currently developed areas and do not provide high quality wildlife habitat. In addition, there are no known populations of Federal or State listed threatened or endangered species in the affected environment. Any enhanced development opportunities are not anticipated to occur in natural habitats or environmentally sensitive lands. In addition, because any accelerated development would occur within undeveloped pockets in currently developed areas, it is unlikely that this development would result in significant habitat encroachment or alteration.

Impacts to Federally-listed endangered and threatened species are regulated by the USFWS under Sections 7, 9, and 10 of the Endangered Species Act. The Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) has regulatory authority over State-listed animals where direct take (killing or injuring) is involved, but the agency does not have authority over destruction of habitat of State-listed animals. For State-listed plants, MDWFP does not regulate either direct or indirect take except for lands owned or managed by MDWFP. For any of the development anticipated to be induced by the proposed project, it would be the responsibility of the individual developers, in coordination with USFWS and MDWFP, to determine if their projects have the potential to affect threatened or endangered species. Because the proposed project is only anticipated to accelerate the rate of the planned development and the regulations governing projected species, indirect effects to protected species are not anticipated.

4.19.1.15 Hazardous Materials

Although a database search was completed for the affected environment, it is possible that development induced as a result of the proposed project could encounter sites contaminated with hazardous materials. To minimize the risk of impacting these sites through land disturbing activities, a Phase I Environmental Site Assessment to identify potential hazardous materials could be conducted prior to property acquisition and development. This is a standard practice in commercial and residential subdivision land development.

The potential adverse effect is associated with additional costs and schedule. There would be a beneficial effect to soil and ground water resources by remediation of the contamination. Potential indirect effects are not considered to be substantial. Although hazardous materials may increase from future development of commercial areas, potential effects would likely be abated

from recent, more stringent regulations regarding hazardous materials management. Therefore, these potential effects are not considered to be substantial.

4.19.1.16 Aesthetic and Visual Resources

The aesthetic and visual direct effects of the elevated viaduct are generally limited to those properties within the immediate vicinity of the viaduct. The MOA, discussed in **Section 4.5.1** and included in **Appendix F**, is anticipated to account and mitigate for the direct effects and in so doing, will also mitigate for any indirect effects. The potential development anticipated would be subject to the regulations of the City of Tupelo. Indirect impacts to the aesthetic and visual resources are not anticipated.

4.19.1.17 Summary of Potential Impacts

Table 4-14 provides a summary of the potential direct and indirect effects. Indirect impacts to other resources are described in further detail. Actual impacts to some of these resources could be reduced, as Federal and State regulations and local ordinances regulate development affecting these resources. In other cases, such as historic and archeological resources, regulation of development applies only to projects requiring Federal monies or permits, and these regulations mandate consideration not protection of the resource. Other resources, such as farmlands, wildlife habitat, and open space, are not effectively regulated for either public or private development.

4.19.2 Cumulative Impacts

Cumulative impacts are defined by CEQ regulations as:

> "*…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from minor but collectively significant actions taking place over a long period of time"* (40 CFR §1508.7).

Cumulative effects (impacts) include both direct and indirect, or induced, effects that would result from the project, as well as the effects from other projects (past, present, and reasonably foreseeable future actions) not related to or caused by this project. Therefore, the cumulative effects analysis includes the direct effects and indirect effects of the proposed project and effects of other past, present, and reasonably foreseeable actions. The cumulative effects analysis considers the magnitude of the cumulative effect on the resource health. Health refers to the general overall condition, stability, or vitality of the resource and the trend of that condition. Therefore, the resource health and trend are key components of the cumulative effects analysis. Laws, regulations, policies, or other factors that may change or sustain the resource trend would be considered to determine if more or less stress on the resource is likely in the foreseeable future. Opportunities to mitigate adverse cumulative

Table 4-14 Summary of Direct and Indirect Impacts

Resource or Topic Evaluated	Summary of Direct Effects	Summary of Indirect Effects
Land Use	Approximately 11 acres of agricultural and vacant land would be converted to railroad right-of-way.	No Effect
Farmlands	No Effect*	No Effect*
Socioeconomic Conditions	Increased traffic flow on roadway network, leading to economic development and growth.	Increased tax revenue, growth, employment, and improved access.
Environmental Justice	No disproportionate effects anticipated.	No disproportionate effects anticipated.
Public Facilities & Community Cohesion	No Effect	No Effect
Cultural Resources	Visual impacts to 37 NRHP-listed or NRHP-eligible sites & districts. MOA to mitigate adverse effects.	Potential viewshed impacts and potential impacts to unknown resources.
Air Quality	Improvement of air quality via reduction of emissions from idling automobile traffic	No Effect
Noise	Decrease in noise severity level at 52 sites	No Effect
Vibration	Increase in vibration imapacts at 18 sites	No Effect
Geological	No Effect	No Effect
Wetlands	Short-term impacts during construction.	No Effect
Floodplains	Impact to 10 acres of 100-year floodplain and 3 new floodway crossings	No Effect
Hydrology & Water Resources	No Effect	No Effect
Section 4(f)	No Effect	No Effect
Wildlife	Not likely to adversely affect Price's potato bean. No effect to other listed species or habitat.	No Effect
Hazardous Materials	Low concern for encountering materials during construction.	No Effect
Visual & Aesthetic	Impacts to resources within immediate vicinity of viaduct. MOA to mitigate adverse effects.	No Effect

*Land that is in agricultural production will be affected, but it is not Prime Farmland as designated by the Farmland Protection Act.

effects on a stressed resource, or a resource that would continue to be stressed would be presented.

The cumulative effects of an action may be undetectable when viewed in the individual context of direct and indirect impacts. Nonetheless, they can add to other disturbances and eventually lead to a measurable environmental change.

The following eight-step evaluation process is intended to provide an efficient, consistent, and logical method of evaluating cumulative effects of a project. The following sections describe each of the eight steps used in this cumulative effects analysis.

Step 1: Identify Resources to Consider
Evaluation of cumulative effects should be completed for any resource that was found to be affected by the project. Resources that were not found to be directly or indirectly affected by the project were not considered in the cumulative effects analysis (CEA). Specific resources and environmental effects categories evaluated in this CEA are listed in **Table 4-14**. These resources include land use, noise and vibration, waters of the U.S., and floodplains.

Step 2: Define the Study Area for Each Resource
The CEA considered both geographic and temporal study limits. A Resource Study Area (RSA) was defined for each resource and is discussed in the pertinent sections. The RSAs are used for characterization of the health condition and trend for each resource and to determine the potential cumulative effects on a resource. Cumulative effects were determined considering the potential cumulative effect on the health and trend within the RSA. Additionally, the temporal limits were considered for the CEA from 1980 to 2030. The US 45 freeway bypass of Tupelo was constructed in 1980 and has since altered the development patterns of the City.

Step 3: Describe the Current Status/Viability and Historical Context for Each Resource
The historical context and health of each resource is described and presented in the resource sections. This information is important to establish the baseline condition and trend the resource is experiencing to be able to estimate the magnitude of the resource effect. The historical context is first described to provide an explanation of the factors that have caused the current health of the resource.

Step 4: Identify the Direct and Indirect Impacts of the Project
This step identifies the direct and indirect effects that could result from the proposed project that may contribute to a cumulative effect when added to non-project related effects. Direct and indirect impacts are defined by CEQ regulations (40 CFR 1508.8) as follows:

"Direct impacts are caused by the action and occur at the same time and place". (40 CFR 1508.8)

"Indirect (secondary) impacts are caused by the action and are later in time and farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate and related effects on air and water and other natural systems, including ecosystems." (40 CFR 1508.8)

The CEA considers the direct and indirect effects, as previously described. A summary of these effects is presented for each resource in **Table 4-14**.

Step 5: Identify Other Reasonably Foreseeable Effects
A CEA requires consideration of past, present and reasonably foreseeable future actions. This is important to provide a context for the types of development projects that have caused the current health of the land and other resources, and the trends the resources are experiencing.

Step 6: Identify and Assess Cumulative Impacts
The CEA considered the direct and indirect effects of the project, together with the effects of past, present, and reasonably foreseeable future projects. The magnitude of the cumulative effect was determined by comparing the effect to the health and trend of the affected resource.

Step 7: Report the Results
The results of the CEA are reported herein. Direct effects and indirect effects are summarized in this section as they are included in the cumulative effects analysis. The assumptions and methods used are described in the appropriate resource sections.

Step 8: Assess the Need for Mitigation
Opportunities for mitigation of adverse effects, where applicable, are discussed for each resource. These are not meant to be mitigation measures that FRA, MDOT, BNSF, or other agencies would, or have the authority to implement. Rather, they are intended to disclose steps or actions that could be undertaken by local, State and Federal agencies and organizations to minimize the potential cumulative effect on each resource health and trend.

4.19.2.1 Land Use

Resource Study Area
For purposes of this CEA, the RSA includes the City of Tupelo. The RSA is the area to which development may or has the potential to occur as a result of the proposed project. Based on the City of Tupelo's comprehensive plan, with the exception of floodplains and existing parks located in the RSA, it can be

assumed that the land within the RSA that is not already developed would be available for future development in one form or another.

Historical Context and Current Health

Existing zoning and land use within and surrounding the City of Tupelo reveal single-family residential and general business development as the main drivers of land development. This follows the trend of the last decade of Lee County as a whole with continuous development and expansion. While the rate of population growth and physical development in this area of Mississippi has been quite high during the last decade compared to State and national trends, the City of Tupelo still maintains the potential to continue development as long as vacant parcels are available for conversion to residential, commercial, or industrial land uses. The majority of the city limits are well-developed. The floodplain areas still remain mostly undeveloped and are used for agricultural purposes. The development patterns have included areas over the entire affected environment, including the Barnes Crossing area north of US 78 and the Fairpark district adjacent to downtown.

Direct and Indirect Effects

Approximately 11 acres of vacant and agricultural land would be converted to transportation right-of-way. To the extent that the opportunity for development is enhanced by the proposed project, indirect effects could occur. Development is anticipated to be consistent with the comprehensive plan and zoning regulations, and, as a result, indirect effects to land use are not anticipated to be significant.

Effects of Other Reasonably Foreseeable Future Actions

Based on the City of Tupelo comprehensive plan, none of the adjacent lands to the BNSF main line are considered for major future development. The zoning designations predominantly match the existing land uses.

Beyond the continued development within the City of Tupelo, three roadway corridors are planned for improvement. MDOT plans to reconstruct MS 6 as a four-lane, divided highway south of the city limits, US 78 is proposed to become I-22, and the City of Tupelo is planning to extend Coley Road north of MS 178 to connect to Barnes Crossing. Although these improvements are not likely to result in development adjacent to the BNSF main line, they would improve development opportunities within Tupelo since better roads can provide more incentive for residents to move to new and existing developments.

Increased mobility and better traffic congestion management would contribute to the continued maintenance of air quality standards in Lee County, which would be considered a beneficial cumulative effect.

Results of the Cumulative Effects Analysis

Although it is not possible to quantify the development from reasonably foreseeable future actions, given the growth in the Tupelo area, the RSA that is not already developed could be available for future development in one form or another. Development is anticipated to be consistent with the comprehensive plan and zoning regulations, and as a result, adverse cumulative effects to land use are not anticipated.

Mitigation

Because adverse cumulative effects to land use are not anticipated, no mitigation has been proposed.

4.19.2.2 Noise and Vibration

Resource Study Area

For purposes of this analysis, the noise and vibration RSA is the same as the Land Use RSA.

Historical Context and Current Health

As the pace of residential and commercial development continues in and around Tupelo, it has likely contributed to higher ambient noise levels in project vicinity. However, these levels within the project vicinity are consistent with those expected in residential and commercial areas, with the exception of train events where noise from train horns and vibration from locomotives and rail cars exceed normal thresholds.

Direct and Indirect Effects

Direct effects of the Build Alternative would include the benefit of decreased noise levels at 52 receivers and the increase in vibration levels at 18 receivers. The vibration impacts would increase, but would not be adverse. Additional noise could result from future development. To the extent that this development is induced by the proposed project, an indirect effect of increased noise levels could occur. The proposed project is only anticipated to enhance the potential for development, rather than induce additional development within the study area. As a result, potential indirect effects to noise levels are not anticipated to be significant. Indirect effects to vibration are not anticipated to occur.

Effects of Other Reasonably Foreseeable Future Actions

It is reasonable that the current trend in growth, including residential and commercial development would continue. As population grows in the Tupelo area and as development spreads into vacant and traditionally rural areas, associated noise and vibration levels would continue to increase.

Results of the Cumulative Effects Analysis

Adverse cumulative effects to noise and vibration are not anticipated. The Build Alternative would result in the benefit of reduced noise impacts and a small, but not adverse, increase in vibration impacts.

Mitigation

Because adverse cumulative effects to either noise or vibration are not anticipated, no mitigation has been proposed.

4.19.2.3 Waters of the U.S.

Resource Study Area

For purposes of this analysis, the RSA is the watersheds of Town Creek, Mud Creek and Kings Creek and their associated tributaries.

Historical Context and Current Health

The four streams crossed by the Build Alternative are designated as impaired in the MSDEQ 303(d) list for their inability to satisfy the requirements of the aquatic life designated use. MSDEQ has established restoration plans, including TDMLs to restore these streams.

Direct and Indirect Effects

The Build Alternative would bridge these four streams, resulting in no adverse impacts to the restoration plans set forth by the MSDEQ or the flood control measures managed by the TCMWMD. Total impacts to waters of the U.S. are anticipated to be approximately 350 linear feet. No wetlands or other special aquatic sites would be permanently impacted by the Build Alternative. The proposed project is only anticipated to enhance opportunities for development rather than induce additional development beyond what is already planned. Regardless of whether development is public or private, it would be subjection to Sections 404 and 401 of the CWA, which regulates impacts to waters of the U.S., including wetlands. As a result, significant indirect effects to wetlands are not anticipated.

Effects of Other Reasonably Foreseeable Future Actions

It is reasonable that the current trend in growth, including residential and commercial development would continue and the TCMWMD plans to channelize the floodways in the Tupelo area would be implemented. Although this development may impact waters of the U.S., any new development would be regulated by Federal, State, and local policies and the USACE would be coordinated with for the TCMWMD channelization plan. As a result, significant adverse impacts to waters of the U.S. from other reasonably foreseeable developments are not anticipated.

Results of the Cumulative Effects Analysis

Significant adverse cumulative effects to waters of the U.S. are not anticipated. Regardless of whether reasonably foreseeable future development would be public or private, these developments would have to comply with Sections 404 and 401 of the CWA, which regulates the filling of and encroachment on these resources and the USACE would oversee the TCMWMD channelization plans. Given the regulatory requirements governing impacts to waters of the U.S., and the mitigation measures discussed in the following section, substantial cumulative effects to these resources are not anticipated.

Mitigation

Because adverse cumulative effects to waters of the U.S. are not anticipated, no mitigation has been proposed. Any new development within these watersheds would be regulated under Section 404 of the CWA. In addition, the TCMWMD maintains easements over all of these local streams and serves to protect water resources, including waters of the U.S.

4.19.2.4 Floodplains

Resource Study Area

For purposes of this analysis, the RSA is the portion of the 100-year floodplain and designated floodways within the City of Tupelo.

Historical Context and Current Health

As discussed in the direct impacts section, flooding is the primary environmental concern around the City of Tupelo. The 100-year floodplain follows the wide, mostly flat Blackland Prairie region. Most of the 100-year floodplain consists of agricultural or vacant land surrounding Town Creek, Mud Creek, and Kings Creek.

Direct and Indirect Effects

Approximately 10 acres of 100-year floodplain would be crossed by the Build Alternative, including three crossings of designated floodways. However, each of the floodway crossings would be on bridge structure and would not run along or parallel to the flow line of the floodway. Much of the impacted floodplain falls within the proposed right-of-way, which could require floodplain compensation ponds, but that determination would be made during the design phase. Indirect effects are not anticipated from the Build Alternative due to the adjacent land also being within the 100-year floodplain and its limited potential for development.

Effects of Other Reasonably Foreseeable Future Actions

It is reasonable that the current trend in growth, including residential, industrial, and commercial development would continue. Although this development may impact the floodplains, the floodplains are not considered

desirable for such development. Any development would be subject to the local ordinances governing development within floodplains. As a result, significant effects to floodplains from reasonable foreseeable future development are not anticipated. The TCMWMD channelization plan for the floodways around Tupelo would be overseen by the USACE.

Results of the Cumulative Effects Analysis

Adverse cumulative effects to floodplains and floodways are not anticipated. Any development would be subject to the local ordinances governing development within floodplains. The TCMWMD channelization plan for the floodways around Tupelo would be overseen by the USACE.

Mitigation

Because adverse cumulative effects to floodplains and floodways are not anticipated, no mitigation has been proposed.

4.20 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

As with any new construction project, the Build Alternative would require certain irreversible and irretrievable commitment of natural resources, manpower, materials, and fiscal resources. As noted above in **Section 4.1.1**, the majority of the Build Alternative would remain within the existing BNSF right-of-way, with a small right-of-way acquisition area from vacant parcels for the storage tracks and approximately 11 acres of either agricultural or vacant land for the interchange tracks. These lands within the proposed right-of-way would be converted from agricultural and vacant land use to transportation use. Use of these lands is considered an irreversible commitment during the time period that the land is used for railroad and roadway facilities. However, if a greater need arises for the land use, or if the railroad or roadway facilities are no longer needed, the land would be converted to another use. At the time of this report, reasons for such a conversion are not anticipated.

Maintenance is an important long-term cost and includes major items such as roadway resurfacing and railroad track conditioning, as well as routine maintenance such as mowing, cleaning drainage structures, bridge maintenance, and weed control. Over time, maintenance cost can be a major expense. Since the Build Alternative is proposing the majority of its improvements on the existing roadway and railroad footprints, much of the maintenance cost will remain unchanged between the No-Build and Build Alternatives. The rail-mile difference between the No-Build and Build Alternatives is comprised solely of the interchange track and the associated storage tracks. The larger differences in maintenance costs between these alternatives is the cost associated with the existing at-grade rail crossings (which would be removed with the Build Alternative) and the maintenance costs associated with the elevated railroad viaduct and Eason Boulevard overpasses.

No-Build Alternative

While the No-Build Alternative would not require an irreversible and irretrievable commitment of resources for construction, the additional maintenance cost for the at-grade

rail crossings and the costs associated with the traffic congestion can be seen as irretrievable commitments. At an annual cost of $17,000 per crossing ($34,000 for the Crosstown intersection due to its size and complexity), the No-Build Alternative would commit $272,000 annually to at-grade crossing maintenance, or a total cost of $6,800,000 by the year 2030. As discussed in the *Phase 1 - Feasibility Analysis* (HDR, May 2006), the total cost of congestion with the No-Build Alternative for the year 2030 will be $81,945,000, with a cumulative cost of congestion from year 2005 to year 2030 of $1,251,000,000. The congestion cost includes the cost of fuel consumption as well as time spent in delay.

Build Alternative

Considerable amounts of fossil fuels, labor, and construction materials such as steel, cement, aggregate, and bituminous material would be expended to complete the project. Additionally, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable, but they are also not in short supply, and their use would not have an adverse effect on the availability of these resources. Any construction would also require a substantial one-time expenditure of State and Federal funds, which is not retrievable.

The commitment of these resources would benefit local residents, the State, and the railroads by removing the rail/auto traffic conflict and increasing traffic flow throughout the Tupelo area. The benefits of improved accessibility, savings in time, and greater availability of quality services are anticipated to outweigh the necessary commitment of resources.

4.21 RELATIONSHIP BETWEEN SHORT-TERM IMPACTS AND LONG-TERM BENEFITS

The most disruptive local short-term impacts associated with the Build Alternative would occur during project construction. As discussed in **Section 2.9.2.3**, one existing business within the proposed right-of-way would require relocation. However, this business, the Summerville Ties loading operation, has few permanent structures, is able to be relocated easily, and is on land already owned by BNSF. Coordination with Summerville Ties is ongoing regarding the relocation to estimate costs and operations requirements. Improved mobility in the downtown Tupelo area could stimulate economic and business growth as well as long-term residential interest.

Construction activities would create short-term air quality, noise, vibration, and visual impacts for nearby residents and businesses. Normal traffic patterns would be disrupted by construction. MDOT standard construction practices and procedures would help minimize these impacts.

Localized water quality could be affected temporarily, specifically by increased turbidity levels in Kings Creek, Mud Creek, and Town Creek and their tributary systems. Use of BMPs would minimize potential water quality impacts. In addition, MDOT would consult with the appropriate Federal and State resource and regulatory agencies to identify measures to minimize these impacts.

The local short-term impacts and use of resources by the Build Alternative would be consistent with the maintenance and enhancement of long-term productivity. Completion of the Build Alternative would be consistent with local, county, regional, and State transportation plans. The Build Alternative would help achieve these long-term goals.

4.22 SUMMARY OF IMPACTS

The quantifiable impacts have been assessed for the No-Build and Build Alternatives of the Tupelo Railroad Relocation Project and are shown in **Table 4-15**.

Table 4-15 Summary of Impacts

Impact Category	No-Build Alternative	Build Alternative
Human Environment		
Farmland Impacts (acres)	n/a	0.0
Residential Relocations (No.)	0	0
Business Relocations (No.)	0	1
Severe Noise Impacted Receptors (No.)	128	76
Vibration Impacted Receptors (No.)	28	46
Adverse Visual Impacts to Historic Sites or Districts (No.)	n/a	37
Hazardous Material Site Impacts (No.)	n/a	0
Environmental Justice Impacted Census Blocks (No.)	n/a	0
Natural Environment		
Perennial Stream Crossings (No.)	3	4
303 (d) Stream Crossings (No.)	2	3
Wetland Impacts (acres)	n/a	0.0
100-Year Floodplain Impacts (acres)	n/a	10.0
Natural Habitats (acres)	n/a	0.0
Engineering		
Electric Transmission Line Impacts (No.)*	n/a	3
Gas Pipeline Impacts (No.)*	n/a	0
Sanitary Sewer Impacts (No.)*	n/a	2
Railroad Bridges (Feet)	n/a	8,690
Roadway Bridges (Feet)	n/a	2,984
Safety and Mobility		
At-Grade Crossings within City of Tupelo (No.)	16	4
At-Grade Crossings with Unacceptable LOS in 2030 (No.)	3	0
Nearby Intersections with Unacceptable LOS in 2030 (No.)	3	1
At-Grade Crossings Blocked During Interchange Operation (No.)	8	0
Construction Costs ($2008)	**n/a**	**$384,745,000**

*Based Upon Field Observations of Above Ground Utilities and/or Markers